CRACKS, FISSURES, AND A POLITICS OF EMERGENCE: EPISTEMIC CONTESTATIONS AND THE POLITICS OF REFRAMING AGRICULTURE IN DEVELOPMENT DISCOURSE

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ABSTRACT

Amidst multiple reinforcing social and ecological crises dominant development agencies are discursively shifting the place and role of agriculture from the periphery to the center of the development agenda. While development discourse is touting the role of smallholder agriculture in supporting development processes and multifunctional agriculture to meet sustainability objectives, the different framings of problems and solutions between the World Development Report 2008 (World Bank 2008) and the International Assessment of Agriculture Science and Technology for Development (IAASTD 2008) are exposing contradictions and tensions within dominant development discourse. This thesis explores the ways in which the re-framing of agriculture as a response to food, energy, and climate crises is being constituted within and external to development discourses, and the potentials for an alternative development. I argue that we are, indeed, in a moment of transition in which the epistemic tensions within development discourse are providing space for a radical shift in how agriculture is conceptualized (and practiced) vis-à-vis food, energy, and climate crises, providing an opportunity for social movements advocating food and fuel sovereignty to flourish within the interstices of the competing visions of agriculture in development discourse. In conclusion, I explore how the discursive and political interventions of the food sovereignty movement, in a moment of declining confidence in agro-industrial food and energy systems, is reformulating the original agrarian question and establishing food sovereignty as the basis for development alternatives. In this transitional moment agrarian social movements are reclaiming the political subjectivity of peasant agriculture grounded on the social and ecological benefits of peasant agrecological practices and knowledges.

BIOGRAPHICAL SKETCH

Ian Bailey grew up in Mountain View, CA. He earned his Bachelors of Art degree in Environmental Studies and Sociology at the University of California, Santa Cruz. While living in Santa Cruz, he interned and worked for the Community Agroecology Network, a non-profit organization composed of a network of five farming communities in Central America and Mexico that work to support sustainable livelihood strategies through action research, educational programs, and alternative trade initiatives. Ian spent six months working and conducting research with a small coffee cooperative, *Coopepueblos*, in Agua Buena, Costa Rica. Ian continued his work on alternative trade networks and fair trade as a research intern at the Institute for Food and Development Policy / Food First, in Oakland, California. In 2007, Ian entered the MSc/PhD program in Development Sociology at Cornell University.

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INTRODUCTION

By 2008, the culmination of food, energy, and climate crises exposed vulnerabilities in the global food economy and shortcomings of dominant development discourse and practice, in which agriculture has been subordinated to industrial development. Although concerns over food, energy, and climate have been building for decades, the shocking reality that over one billion people suffered from chronic hunger in 2009 has forced a reframing of agriculture and development. Once a neglected aspect of the development industry, agriculture is taking center stage within dominant development discourse and international reports.

The convergence and magnitude of these interrelated crises has provoked cracks and fissures in the development agenda, as evidenced by the nearly simultaneous publication of two international reports produced by key development institutions – the International Assessment of Agricultural Knowledge, Science, and Technology for Development Report (IAASTD) and the 2008 World Development Report (WDR[1]). These two reports are chosen largely on the basis of their influence on development discourse and practice. As the world's largest development lending institution, the World Bank (author of the WDR) plays a pivotal role in setting the mainstream development agenda. The IAASTD is sponsored by a prominent group of development institutions, including the UN Environment Program, Food and Agriculture Organization, and Development Program; UNESCO; Global Environment Facility; and (ironically) the World Bank.[2] As one of the largest and most thorough assessments of global agriculture, involving more than four years of research from

[1] Unless otherwise specified, the acronym "WDR" refers to the World Development Report 2008.
[2] Ironically, though a funder of the IAASTD, the World Bank neglects its findings, particularly those that compete with or challenge economistic logic embedded in an agro-industrial episteme. For the purposes of this thesis, the inner politics of this irony will not be explored and these reports will be treated as two diverging epistemic positions on the role of agriculture in development in a moment of food, energy, and climate crises.

over 400 experts, the findings and conclusions of the IAASTD will be a prominent feature in contemporary development debates, and it serves as a strong counterpoint to the WDR within dominant development agencies (Ishii-Eiteman and Ching 2008).

Reflective in both of these reports is the discursive re-framing of agriculture vis-à-vis development and contemporary social and ecological crises. Whereas previous development discourse framed small-scale farmers as *obstacles* to capital accumulation and agricultural sectors as the *servant* to national industrial development, the culmination of food, energy, and climate crises are provoking a re-thinking of the role and place of smallholder agriculture. Once peripheral (and an impediment) to development, agriculture is being re-envisioned as a potential engine for economic growth and as the solution to ecological and energy crises. The WDR and the IAASTD present two competing framings of contemporary crises as well as conflicting visions for the future of smallholder farmers in relation to development and these crises.

For the WDR, the re-framing of agriculture assumes the inefficiency of smallholder agriculture and thus recommends the consolidation of industrial agriculture through global market integration and increased productivity via technological innovation. The WDR's argument for the potential of agriculture to meet energy and ecological demands while simultaneously supporting economic growth, reproduce anew the historical trend of subordinating agriculture to capital and reinforce historically constituted unequal and uneven power relations between the global North and South. Reframing these crises as Malthusian dilemmas where population growth and diminishing natural resources require technological interventions in the global South to maximize yields and adapt to climate change, the WDR sanctions the biotechnology industry and the corporate food regime strategies of commercializing smallholder agriculture.

In contrast to the WDR's advocacy of an agribusiness-led agrarian transformation, the IAASTD poses an epistemic alternative, problematizing industrial agriculture and focusing on the displacement of small-scale farmers and embedded knowledges as a central aspect of contemporary crises. Though the IAASTD does not challenge "development" itself, it views the negative consequences of the green revolution model of agro-industrialization – soil erosion, water contamination/scarcity, population displacement, increased fossil fuel consumption, etc. – as greater than the purported productivity gains. The IAASTD calls for a radical rethinking of agriculture, which does not abandon market integration or technological innovation, but is focused on maintaining small-holder farms and preserving and building off of place-based traditional knowledges.

One of the key areas in which the epistemic tensions in the WDR and IAASTD are most evident is in their assessment of biotechnology as a 'solution' to the food, energy, and climate crises and their conceptions of multifunctionality and smallholder farmers. In addition to the WDR's support of biotechnology as an avenue for sustainable development, the WDR's "agriculture for development" agenda promotes a market-based approach to food security that undermines food sovereignty.[3] This approach to agriculture and development strengthens the corporate food regime by promoting a privatized notion of agricultural multifunctionality that paradoxically exacerbates energy, food, and climate crises by extending the agro-industrial model of production, expanding commodity relations, and displacing locally situated

[3] The 'food sovereignty' movement contrasts with the notion of 'food security.' Food Security in its most common use is the 'human right to sufficient food'. Nationally, food security is no longer premised on a notion of food self-sufficiency, but generally on the right to predictable food sources. As a legal concept food security is largely based on the right to food markets and food imports. When countries lack the currency to import food, humanitarian food aid provides a 'safety net'. In contrast, food sovereignty is based on the political rights of people, communities, and countries to own and control the productive means to meet their food needs. Although the concept of food sovereignty is not opposed to trade, it challenges the notion of free markets and calls on governments to protect the right of farmers (Lee 2007, Rosset 2003, McMichael 2004). These ideas will be expanded upon in Chapter Three.

knowledges. Alternatively, the IAASTD interprets multifunctionality in agriculture such that local and traditional knowledge among smallholder farmers plays a central role in meeting the multiple needs of communities and ecosystems. The challenges to unrestrained acceptance and implementation of biotechnology and market integration posed by the IAASTD reflect epistemic tensions and critical disjunctures in programmatic assessment and policy prescriptions in development discourse and practice.

I argue that the epistemic tension within development discourse is reflective of the tenuousness of the current agro-industrial paradigm, signaling the possibility for a politics of emergence in which food and fuel sovereignty movements may consolidate as viable development alternatives. The IAASTD's challenge to dominant development discourse lends legitimacy to food and fuel sovereignty movements' attempts to revalorize smallholder agriculture and local knowledge and to subordinate marketization and technological innovations to social and ecological justice and sustainability. This paper argues that we are, indeed, in a moment of transition in which the epistemic tensions within development discourse are providing space for a radical shift in how agriculture is conceptualized (and practiced) vis-à-vis food, energy, and climate crises, providing an opportunity for social movements advocating food and fuel sovereignty to flourish within the interstices of the competing visions of agriculture in development discourse.

ORGANIZATION

This thesis explores the ways in which the re-framing of agriculture as a response to food, energy, and climate crises is being constituted within and external to development discourses. Chapter 1 investigates the distinctive ways in which the WDR and the IAASTD have interpreted and assessed the crises and reframed the role

of agriculture in development. The WDR's emphasis on market failures, Malthusian framing, and a lack of 'development' as the underlying causes of these crises contrasts starkly with the IAASTD's more complex problematization of the agro-industrial model and its negative consequences. This chapter examines the characteristics, assumptions, and interests at stake in the reframing of agriculture at this historical conjuncture, arguing that the divergent perspectives of the WDR and the IAASTD constitute an epistemic conflict within development discourse.

Chapter 2 examines how the WDR and the IAASTD envision solutions to food, energy, and climate crises. Focusing specifically on the role of biotechnology, this chapter examines central epistemic differences in conceptualizations of the place and purpose of biotechnologies, approach to market-oriented agriculture and agri-business, understandings of multifunctionality, views of small-holder farms, and systems of valuation. The WDR's emphasis on corporate-driven economic development undermines its stated goals of reducing smallholder poverty and supporting sustainable agriculture (specifically harnessing the multiple functions of agriculture to promote food, energy and climate security). In doing so, the WDR reproduces modernist assumptions of development, which presume the death of the peasantry and espouse the productive efficiencies of agribusiness as a vehicle for 'sustainable' economic growth. In contrast, the IAASTD takes a much more cautious approach to biotechnology. Here, biotechnological application is considered appropriate to the extent that it promotes the viability of agroecological alternatives, the promotion of smallholder farms, and the integration and reproduction of embedded knowledges.

Chapter 3 provides an illustration of the practical extensions of these diverging epistemes where the material and discursive struggles over the role of smallholder agriculture in development expose the features of contemporary global double movement (Polanyi 2001). I argue that development discourse and corporate agrofuel

projects are converging around a green development agenda that hinges on corporate managed multifunctional agriculture. This development agenda expresses the disembedding side of Polanyi's double movement on a global scale by transforming and subordinating embedded ecological relations to global commodity relations. However, the contrasting conception of multifunctionality presented in the IAASTD reveals cracks within dominant development discourse through which agrarian social movements are challenging the legitimacy of the corporate food regime and consolidating a transnational protective movement. Competing paradigms of multifunctionality and agrarian development (agro-industrial and food sovereignty) expressed within this global double movement crystallize the tensions of a transitional moment (Friedmann 2005, McMichael 2009c).

On one hand, the corporate food regime is consolidating its power under the premises of 'green capitalist development' as endorsed by the WDR's agriculture for development agenda. The reproduction of the dominant development model is epitomized by the current corporate-led agrofuel expansion as a solution to energy and climate crises. The emphasis on agrofuels illustrates the ways in which the corporate food regime is exploiting technological and market-based responses to social and ecological crises to strengthen the corporate control of food and fuel systems. On the other hand, the epistemic tensions illustrated in the WDR and IAASTD reflect emerging challenges to the agro-industrial model within development discourse and an opportunity for agrarian social movements to establish the centrality of smallholder agroecological knowledges and practices in addressing social and ecological crises. The challenge to the dominant development model, reflected in the IAASTD, and the ecological contradictions of corporate agrofuel projects represent declining confidence in agro-industrial food and energy systems, providing the opportunity for development alternatives to consolidate at the interstices of these cracks and fissures (Friedmann

2005). These opportunities are evident in the food sovereignty movement, as illustrated by the transnational peasant federation La Via Campesina (McMichael 2006, 2008).

In conclusion, I explore how the discursive and political interventions of the food sovereignty movement, in a moment of declining confidence in agro-industrial food and energy systems, is reformulating the original agrarian question and establishing food sovereignty as the basis for development alternatives. This moment of potential transition implies a re-framing of the agrarian question in which agrarian social movements are reclaiming the political subjectivity of peasant agriculture grounded on the social and ecological benefits of peasant agrecological practices and knowledges. Whereas the food and fuel complex reflect a marketized conception of agricultural multifunctionality that disembedds agriculture from its social and ecological foundations (thus reproducing socio-ecological crises), La Via Campesina and the food sovereignty movement express a transnational countermovement premised on smallholder multifunctionality embedded in local agroecological knowledges and practices that restore and protect social and ecological sustainability.

CHAPTER 1
RESPONDING TO THE CRISES: RE-FRAMING AGRICULTURE IN DEVELOPMENT DISCOURSE

Nothing obscures our social vision as effectively as the economistic prejudice. (Polanyi 2001: 166)

This chapter provides a discursive analysis of the ways in which the WDR and IAASTD frame agriculture in relation to food, energy, and climate crises. Before embarking on this analysis, I describe the characteristics of these three contemporary crises. I then explain how the WDR frames these crises and the role of agriculture and development therein. Next, I contrast the WDR's framings with those of the IAASTD, followed by a discussion of the implications of these divergent perspectives and the significance of the ways in which these issues are framed. Central to the framing of agriculture and development is how value is constructed, who decides what is valued, and by what measure, and lastly, what forms of knowledge is counted. It is argued here that the discursive framings of the WDR and IAASTD expose divergent and conflicting valuation systems and reflect epistemic tensions in the dominant development paradigm. While the WDR reproduces the agro-industrial model through modernist and ahistorical assumptions of development that depoliticize the causes of crises, the IAASTD problematizes the agro-industrial model, arguing for an approach to agriculture that privileges local knowledges and subordinates market-oriented agriculture to food security and ecological sustainability.

SETTING THE STAGE: INTERLOCKING CRISES OF THE NEOLIBERAL CONJUNCTURE

In the opening speech of the World Food Conference in 1974, Henry Kissinger proclaimed "within a decade no man, woman or child will go to bed hungry." However, despite increased rhetorical and financial efforts of OECD countries to reduce food insecurity in the global South over the past three decades (mainly through

Structural Adjustment loans and food aid), the UN Food and Agriculture Organization (FAO) calculates that in 2009 over 1 billion people suffered from hunger (2009). Between 2005 and 2009, and especially during the final months of 2007, the world witnessed unprecedented food inflation. *The Economist* food price index increased by 75% between 2005 and 2007, reaching its highest price since it was initiated in 1845. By 2008 maize prices doubled, rice increased by 70%, wheat by 50%, soy was up 60%, and cooking oil prices rose precipitously (Magdoff 2008, Holt-Gimenez 2008). As a result of skyrocketing prices and a lack of social safety nets (a casualty of neoliberal restructuring), people took to the streets instigating riots in over 30 countries, including Mexico, Egypt, Mozambique, Haiti, Indonesia, and Pakistan (Bello 2008; Holt-Gimenez, Patel, and Shattuck 2009). The food import bill in the global South grew by 30% in 2006, and an additional 37% in 2007 (Bello 2008).

This period of food inflation developed concurrently with the mutually constitutive problem of rising energy costs. While energy prices gradually rose over the first decade of the new millennium, the price of oil spiked between 2006 and 2008, destabilizing energy security in many countries in the global South and raising the cost of agro-inputs. Consequently, farmers dependent on agro-inputs were subject to the price setting of agro-input corporations (whom, according to GRAIN 2008a, increased prices far greater than increases in energy prices), rising transportation costs exacerbated food prices, and rising costs of food, oil, and agro-chemical imports further indebted countries dependent on these imports. Another effect of high energy and food costs was that agro-input corporations and grain traders were able to maintain record profits at the expense of both farmers (through higher production costs) and consumers (in higher food prices) (GRAIN 2008a). Likewise, it spurred a concerted effort by agribusiness and industrialized countries to support and expand the production of agrofuels as an alternative energy source, yet these projects largely

exacerbated both food and climate crises without any significant energy gains.[4] According to the World Watch Institute, the era of cheap and abundant oil is quickly coming to a close as global demand for energy has been growing on a per-capita basis since 1981 (Brown 2006). Oil extraction has exceeded oil discoveries at an increasing rate since the 1980s. For example, in 2008, 31 billion barrels of oil were extracted from the earth while only 9 billion were discovered (Ibid). Of the 2 trillion barrels of oil discovered globally, the International Energy Agency (IEA) estimates that over 1 trillion barrels have been consumed (Klare 2008). The first trillion barrels of oil were relatively easy to access and extract, according to Michael Klare, but the next trillion barrels will require more energy and capital-intensive processes to extract (2008).

While both the food and energy crises represent serious threats to human survival, climate change has taken center stage as the defining global ecological crisis of contemporary times.[5] In the words of the 2007/2008 Human Development Report, "climate change is the defining human development issue of our generation" (quoted in McMichael 2009a: 248). According to the 'poverty and climate change' report of the United Nations Framework Convention on Climate change (UNFCCC), climate change "is a serious risk to poverty reduction and threatens to undo decades of development efforts" (Ibid: 248). Agriculture is central to climate change as it is both a contributor to (mainly from land use change and intensive agricultural practices) and victim of global climate change (due to more variable weather conditions, especially in relation to water availability). Although estimates vary, the IPCC cautiously calculates that agriculture contributes 10-12% of global greenhouse gas emissions

[4] See Pimentel (2009a) for a break down of the energy balance of various agrofuels (that is, how much energy it takes to produce feedstocks and convert to fuel as compared to the amount of energy obtained through fuel combustion.)

[5] While climate variability poses a serious threat to rain fed agriculture, the affects of climate change on water availability may be the most important factor. Agriculture accounts for 69% freshwater consumption and is the source of 70% of water contamination (Brown 2006; McNeill 2001).

(GHG), and 60% of N2O and 50% of CH4 (Smith et al 2007). When land use change and food transportation, processing, and preparation are taken into account, industrial agrofood systems account for around a quarter of all GHG emissions. According to the IPCC, agricultural emissions of CH4 and N2O globally rose by 17% between 1990-2005, and within this century, they project that average global temperatures will rise between 4 and 6°C with catastrophic effects on coastal areas, water resources, agriculture, and people who make their livelihoods from functioning ecosystems (Ibid). Historically constituted relations of consumption and exploitation define the ecological debt between the global North and South. For example, while the "North accounts for 80% of CO2 build up in the atmosphere", the burden of climate change will disproportionately affect the global South (McMichael 2009a: 248).

Whereas the intertwining of fossil fuel consumption and industrial agriculture on one hand worsens climate change, climate change in turn threatens to undermine the biological conditions of production in many areas of the world, especially coastal areas and regions under water stress. This predicament is precisely why agriculture has received renewed attention in development discourse in this historical moment. Both the WDR and IAASTD recognize the interconnections between agriculture and these crises, reflected in the conceptual shift in both reports: once marginalized to the periphery, agriculture is now at the center of the development agenda. In addition, both reports emphasize the multifunctionality of agriculture to meet food and energy needs and to ensure ecological sustainability. However, the ways in which the two reports interpret these interconnections reflect diverging epistemes, the configuration of which is the focus of the following sections.

RESPONDING TO THE CRISES: THE WDR AND THE "AGRICULTURE FOR DEVELOPMENT" AGENDA

Historically, agriculture has played a peripheral role in the World Bank's approach to development. The World Bank's first two and a half decades did not focus on agriculture at all; loans were primarily granted for infrastructure projects in moderately affluent countries (Goldman 2005). It wasn't until the 1970's that the World Bank, under the guidance of Robert McNamara, turned towards the goals of "poverty alleviation" through promoting agriculture and rural development (*ibid*). In his own words, McNamara referred to agriculture as the "stepchild of development" (1973; quoted in Goldman 2005: 70). In the 1970s the World Bank's strategy for rural development and poverty alleviation focused on modernizing smallholder agriculture via green revolution technological packages including state-based promotion of synthetic fertilizers, pesticides, hybrid seeds, and irrigation systems. Despite the World Bank's discourse of reducing poverty through promoting agriculture, the green revolution strategy of agricultural development was premised on maximizing the productive efficiency of large-scale industrial agriculture and thus moving inefficient farmers out of the countryside. Far from reducing poverty, green revolution projects exacerbated inequalities, consolidating lands in the hands of wealthy farmers and displacing or marginalizing peasant farmers (Araghi 2000). Furthermore, the World Bank's promotion of export agriculture (as a means of earning foreign currency) was one of the main factors leading to the debt crisis of the 1980s. As increasing yields and subsidized US and EU grains drove down international commodity prices 'developing countries' could not earn enough foreign currency to repay their loans. The debt crisis ushered in the era of structural adjustment at the World Bank and the turn towards neoliberal economic policies, relegating agriculture again to the bottom of the development agenda (Goldman 2005).

Thus after a 25-year hiatus, the fact that the World Bank is revisiting the development potentials of agriculture, as demonstrated in the 2008 WDR, is a significant discursive shift in development priorities. This shift, in part, is a response to rising food insecurity and ecological crises, but also to the declining legitimacy of the neoliberal development paradigm, and thus, is an effort to re-legitimize development discourse and practice. In sum, this discursive shift is an attempt to re-establish the prominence of development during a historical moment of multiple and mutually conditioning social and ecological crises.

While the WDR reflects the growing concern over the consequences that food, energy, and climate crises will have on agriculture, poverty, and development, it reproduces the modernist narrative of 'backward' (inefficient) peasant agriculture and the inevitable, and necessary, transition to an (efficient) agro-industrial model of agriculture and corporate-led commodity chains (McMichael 2009d; Amanor 2009; Akram-Lodhi 2009a). The WDR's response to these mounting crises illuminates how the World Bank is reframing agriculture and development in ways that mask underlying power relations. Based on modernist assumptions of autonomous state-based growth, universalized notions of progress, and teleological conceptions of development (stages of growth), the WDR provides ahistorical and depoliticized discursive framings of food, energy, and climate crises in the idiom of sustainable development (or 'green capitalism'[6]). In particular, the WDR employs state-based development narratives, and Malthusian and market-based framings of hunger and poverty that obscure (or misconstrue) historically constituted political and economic relations. Although it proclaims support for small-scale agriculture, the WDR's vision

[6] "Green capitalism" refers to an ideology that perpetuates capitalist forms of production and distribution, relying heavily on technological and market-based interventions as means of promoting sustainable development. This concept is elaborated in chapters two and three (Goldman 2005; Friedmann 2005).

of agricultural efficiency entails the consolidation of land to maximize economies of scale, historically an avenue of peasant dispossession.

De-politicizing Crises: Market-Based and Malthusian Framings in the WDR

According to the WDR, the contemporary crises are framed as such: food insecurity is a result of market failures and low productivity while ecological and climate crises are attributed to poor resource management and poverty. Both of these explanations locate responsibility for current crises either in the global South or as a result of market failures. Such an approach necessarily neglects historical social and political relations.

The WDR's framing of food insecurity in terms of market failures is demonstrated in the report's analysis of the world food crisis of the 1970s. The WDR argues that supply and demand forces pushed food prices up while low foreign exchange reserves limited the ability of poor countries to import food. The problem was purportedly worsened when countries tried to intervene in the market, as opposed to letting the free market adjust and stabilize prices. In the words of the WDR,

> This rise in prices prompted some countries to look inward, striving for food self-sufficiency through domestic production. But today with deeper international markets, lower real prices, and more countries with convertible exchange rates, trade can stabilize food availability and prices for most countries. And most countries have diversified their export base, increasing their capacity to import (2008: 94).

In these economistic terms, attempting national food self-sufficiency is an anachronism that needs to be replaced by the allocative efficiencies of the global market. Food security for the WDR is predominantly defined by the ability of nations to import food and individual households to purchase food in the marketplace. Paradoxically, food security is particularly challenging for agricultural-based countries that are net-importers of food. The WDR explains,

> Almost all the agriculture-based countries are net importers of food staples, importing on average 14 percent of their total consumption over the past 10 years…most of the food insecure live in rural areas where food is produced, yet they are net food buyers rather than sellers. Poverty constrains their access to food in the marketplace (2008: 95).

The WDR does not investigate why countries in the global South went from food self-sufficiency to net food importers. Instead, instituting markets and export-led development are presented as the answer to the global South's food crises, as opposed to part of the problem. When problems arise from export-oriented agricultural policies, they are explained as a product of market imperfections. Using the example of Brazil, the WDR argues,

> Yield gaps can arise because imperfections in credit and insurance markets prevent small farmers from adopting more productive capital-intensive techniques or higher-value products…Imperfections in capital and insurance markets, combined with transaction costs, can also prevent markets for land sales and rentals from allocating land to the most efficient users (2008: 70).

Consistent with neoliberal economic theory, markets are assumed to be self-regulating, constantly achieving supply and demand equilibrium, creating price incentives and competition structures that increase production and distribution efficiencies. Market imperfections, according to this logic, arise from market interventions by the state, or other factors, that limit the 'self-regulating' mechanisms of the market.

By naturalizing the market, the WDR neglects that markets are always political constructions. 'Market imperfections' are structural and political problems (as opposed to a natural outcome of economic laws) based on the unequal distribution of power within markets and the perpetuation of unfair trade regimes as dictated by the global North and established through international trade agreements (McMichael 2004). The political construction of markets is exemplified in the trade regime imposed through the "Agreement on Agriculture" (AoA) developed within the

General Agreement on Tariffs and Trade (GATT) and institutionalized with the creation of the World Trade Organization (WTO) in 1995. The initial AoA within the WTO rested on three issues; market access, export subsidies, and domestic support (Rosset 2006). Accordingly, countries were expected to reduce tariffs as a way to open national markets to global trade, ban export subsidies as way to stop agricultural dumping and create fair competition, and lastly, countries were allowed to maintain certain domestic programs (with the expectation of decreasing these) categorically distinguished by various "boxes" (Amber, Blue, Green) which subsidize (without distorting trade) environmental or social programs (ibid). However, hidden in the complexity of legal and economistic regulatory language was a clear manipulation of the terms and conditions of these rules by the European Union and United States, which allowed countries in the global North to maintain subsidy programs supporting agro-industrial operations while the global South was expected to reduce support programs for smallholder farmers and open domestic markets to subsidized European and American commodities (McMichael 2004). Hence, framing these problems as market imperfections obscures the political relations underlying market rules, and implies that liberalized markets can be perfected if the appropriate institutional policies allow the market to be free. The WDR's depoliticization of markets is one aspect of a general neglect of historical social relations. In exposing the paradox that agricultural countries, and specifically rural areas, account for a large portion of food insecure people, the WDR neglects to historicize the policies and political interventions that have created food insecurity in these countries.

Rarely are hunger and famine the sole result of food shortages or a lack of food production.[7] More fundamentally, food insecurity is socially and historically

[7] Currently, as well as during the 1970s food crisis, global per capita food production is more than enough to feed the global population, and in many cases, national and regional per capita food production can meet domestic food security in the global South (Lappé, Collins, and Rosset 1998;

constituted within power relations that distort global, regional, and national production and distribution priorities (Lappé, Collins, and Rosset 1998; George 1976; Weiss 2007). Although hunger and starvation are not new in human history, the scale, severity, and frequency of famines dramatically increased during the colonial period (Davis 2002).[8] For example, colonial restructuring of property relations and forceful integration of peasant agriculture into global markets created social vulnerabilities in the global South by promoting luxury food exports, such as coffee, sugar, tobacco, tea, and tropical fruits, at the expense of local and national food production and security.[9] As such, colonial regimes disrupted and transformed local moral economies that maintained food storage for provisioning during years of low production, into export economies dependent on market-based food provisioning, which favored elite classes and created vulnerabilities for farmers and the working poor (Davis 2002). Meat consumption has also skewed national and global food production and distribution towards affluent markets. Over the last half-century, staple grains have increasingly been diverted from food production to livestock feed to meet the growing meat consumption of affluent consumers (Weiss 2007). Underdevelopment and dependency theorists argued that contemporary global inequalities are conditioned by historically constituted power relations of colonialism and reproduced through global market relations (Amin 1994, Frank 1994). Challenging the Modernization theoretical conception of linear and progressive stages of capitalist development, dependency and

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George 1976; Weiss 2007).

[8] Prior to the emergence of a global food economy, countries and societies suffered from periodic food shortages as a result of climatic variability, declining soil fertility, pest infestations, or other socio-ecological disruptions, however, these food shortages were usually geographically bound and were managed through local adaptations in production and distribution systems that limited the extent of starvation. Tying food production and provision to the logics of global markets, transformed locally and culturally embedded production and distribution systems and limited the ability of local communities and nations to manage food supplies (Davis 2001).

[9] For example, India is one of the largest agricultural exporting countries in the Global South, but nearly 200 million Indians suffer from hunger (Lappé et al 1998: 9). Likewise, Brazil exports food while nearly 70 million Brazilians cannot afford sufficient food (ibid: 10). During the 1980s food exports in Sub-Saharan Africa exceeded food imports (ibid: 10).

underdevelopment theorists argued that colonialism, and its civilizing mission, fundamentally reconfigured colonial economies (subordinately) and social orders through resource/wealth extraction, capital accumulation and violent dispossession of land (Frank 1994; Bernstein 2000). As opposed to framing 'colonial countries' as earlier 'stages' of societal development (or civilization), dependency theorists argued that the development of Europe was only possible through the forceful incorporation and underdevelopment of colonial societies into a global capitalist order (Frank 1994). Accordingly, capitalist economic expansion and colonialism structured power relations between the periphery and the core, creating social vulnerabilities and economic dependencies in the global South and conditions for capital accumulation in the global North (Amin 1994).[10]

In similar fashion, Mike Davis argues in *Late Victorian Holocaust* that the culmination of colonial policies, integration in capitalist markets, and El Niño climate patterns precipitated the tragic famines in late Victorian India and China (2001). Although droughts in India and China reduced grain harvests, it was the shift to export-driven agriculture and the stripping of state services that created the conditions in which drought resulted in mass starvation. Thus the impact of natural disasters is a combination of the intensity of a natural event/hazard and the socially constituted vulnerability of the population (resistance and resiliency). Davis shows how the colonialist project – with its classical economic ideology – created peasant vulnerability on a massive scale. In his words, "Millions died, not outside the "modern world system," but in the very process of being forcibly incorporated into its economic and political structures" (Davis 2002: 9). The imperialist project of

[10] Importantly, the 'development industry', as Rist calls it, perpetuated colonial relations through discursive framings of growth, progress, and modernity as colonial empires attempted to legitimize continued international intervention, thus perpetuating these historical relations under the premises of development (2002).

integrating colonized countries into the global capitalist markets deteriorated national sovereignty and dismantled agrarian social orders and the ability to maintain national or community food security (Bernstein 2000; Davis 2002). Without state protection and stripped of the means of subsistence, the political implementation of unequal market relations undermined the ability of farmers to survive.

Similarly, market-based reforms imposed by International Financial Institutions (such as the IMF, World Bank, WTO) have maintained and reproduced conditions of vulnerability in the global South under premises of international development. The debt crisis, SAPs (ironically, the World Bank's very own), and free trade policies, also played a prominent role in constructing small-holder vulnerability and instigating processes of depeasantization in the global South (Bello 2008; McMichael 2004; Araghi 2000; Patel 2002; Toussaint 2005). In 2001, for example, part of the International Monetary Funds' loan conditionality for Malawi was to reduce grain reserves from 165,000 metric tons to less than 60,000 tons for the purpose of earning more foreign exchange to service debts (Patel 2002). The following year people starved as national grain harvests decreased, reserves were depleted, and people could not afford imported food (as was proposed by the IMF, and similarly in the market approach to food security proposed in the WDR). The dismantling of social safety nets and the disruption of local markets by subsidized imports in the case of Malawi, illustrate the political implementation of markets and the creation of the conditions of vulnerability for African farmers.

Neglecting these historical relations, the WDR argues, "*Today, agriculture's ability to generate income for the poor, particularly women, is more important for food security than its ability to increase local food supplies*" (2008: 95, original emphasis). Without problematizing the World Bank's role in creating food insecurity, the WDR argues that income generation is more important for meeting food security

than growing food domestically.[11] As a way to earn foreign exchange and balance import bills, the WDR promotes what they call the 'new agriculture,' which focuses on producing high value horticultural, livestock, and vegetables for European consumers. However, this reinforces the export-oriented model of agricultural development that created the conditions of food insecurity in the first place.

In addition to its ahistorical, economistic approach to food insecurity, the WDR recycles Malthusian framings to explain ecological degradation, poverty, and hunger as an additional way to displace responsibility from the global North to the South. In explaining the "drivers of resource degradation," the WDR points to poverty, population growth, and resource scarcity:

> Poverty is more likely to drive resource degradation in less-favored regions, where poor-quality and fragile soils must support rising populations densities… Population pressure has mixed impacts on resource degradation, depending mainly on the available technology. As Malthus observed in 18th century England, population pressure without technological advances leads to agricultural encroachment into ever-more-marginal areas, reducing average yields, degrading resources, and worsening poverty. When suitable technologies and institutions are available, however, population growth can lead to their adoption and sustain improvements in resource conditions and yields[12]…[however,] when population pressure is combined with high initial levels of poverty and few technology options for boosting productivity, degradation and poverty can spiral downward (2008: 181-182).

Population growth without technological advancement is presumed by the WDR to be the underlying dynamic of smallholder marginalization, and thus neglects the historical processes and political relations that cause smallholder marginalization. In doing so, problems associated with smallholder marginalization are framed as technical issue as opposed to a political issue. The report frames smallholder

[11] As will be elaborated further on, market-based approaches to food security have been strongly critiqued by the food sovereignty movement.

[12] "Because many natural resource management technologies are labor intensive population growth can actually assist their uptake because it lowers labor costs…"

marginalization as an inevitable process of nature (population growth and resource scarcity) – a product of the uncontrollable reproduction of the 'poor' that leads to their own poverty. This image is invoked when the WDR employs the 'vicious cycle of poverty' metaphor ("degradation and poverty can spiral downward"), where poverty and population growth lead to over-exploitation of resources, thus exacerbating poverty and extending degradation to new lands (Ibid:181-182). As with its approach to food insecurity, the WDR treats poverty as the natural condition of smallholder farmers, or as McMichael explains, the depiction of a poor African woman laboring in the fields in the opening line of the WDR "recycles the trope of poverty as an original condition defining much of the rural South" (2009d: 235).

Accordingly, the WDR frames low-input agricultural practices of the poor as a major cause of environmental degradation. Although the WDR cautions that intensive agriculture can lead to increased pollution, extensive agriculture driven by resource-poor farmers is the main culprit of ecological degradation in their schema and is therefore in need of development. This is evident in the WDR's objectification of nature and social relations of production in constructing the concept of "less-favored areas."[13] Less-favored areas, according to the WDR, consist of two main features, a lack of market access and "poor agroecological conditions" (2008: 35). In explaining the plight of less-favored areas the WDR states,

> …they are mostly characterized by extensive agriculture, resource degradation, and poverty…[and] encompass a broad array of low-input farming systems…Land degradation and deforestation in less-favored areas reduce agricultural productivity and cause the loss of other valuable ecosystem services, including biodiversity habitats…[for example,] soil nutrient mining resulting from shortening of fallows and

[13] "Many less-favored areas have gained little from past agricultural successes in raising yields. Less-favored areas include lands with low agricultural potential because of poor climate, soil, and topography; they also cover areas that may have higher agricultural potential but are underexploited because of limited access to infrastructure and markets, low population density, or social and political marginalization" (World Bank 2008:190).

> very low use of fertilizer is endemic across much of Sub-Saharan Africa (2008:190-191).

In defining "less-favored areas," the WDR employs naturalized (and politically sanitized) language of geography and demography, conjuring a sense of inevitability. While the WDR claims to focus on helping farmers in "less-favored areas," they neglect to explain the historical processes that caused such marginality (again, naturalizing their condition). By invoking the imagery of destitute lands being exploited by the primitive practices of poor people, the WDR depoliticizes the processes that lead to both resource degradation and poverty, proposing that poverty, hunger, and resource degradation is a technical problem (to be solved by expert knowledge/technology) as opposed to a political problem. Missing the ways in which colonial restructuring, green revolution projects, and structural adjustment policies often create and perpetuate these conditions of marginality, the WDR provides an ahistorical account of these processes and thus reestablishes the need for external intervention: as the WDR identifies the practices of the poor as the source of ecological degradation, it points to technological improvement as the solution (to be discussed further below). While these framings stem from modernist assumptions of development, they also serve to reproduce the institutional and programmatic objectives of dominant development institutions (i.e. providing loans for technology transfers).

The discursive framing of "Africa" serves as an illustrative example of the WDR's approach to food insecurity, ecological degradation, and poverty. The constant refrain that Africa missed the green revolution is presented as a major cause of poverty and hunger in the continent. Comparing Africa to Asia and Latin America, the WDR argues that while modern seeds and fertilizers rapidly improved agricultural productivity in Asia and Latin America, Africa still suffers from low productivity.

The implementation of seeds and fertilizers in Latin America and Asia, the WDR explains:

> …[were] accompanied by complementary investments in irrigation, rural roads, marketing infrastructure, financial services, and other factors that made using seed and fertilizer profitable and paved the way for dynamic commercial input markets. But throughout most of Africa, these complementary investments are small or nonexistent, and private input markets have yet to emerge on a large scale (2008: 150).

The WDR implies that hunger and poverty in Africa is the consequence of a lack of agro-chemical input markets that elsewhere stimulated economic growth. Input and output markets are assumed by the WDR to be central coordinating features of modern agricultural production, where inputs and outputs are managed by agribusiness to increase yields and household incomes to meet food security. The WDR views commercial agriculture, fully integrated in markets, as the most efficient method of reducing poverty and meeting food security. Accordingly,

> Sub-Saharan Africa is massively disadvantaged in infrastructure, increasing transaction costs and market risks…Largely because of poorly developed markets, fertilizer use in Sub- Saharan Africa has stagnated at very low levels, one of the main reasons for the region's low agricultural productivity relative to Asia…[and] low volumes, high prices, high transport costs, and undeveloped private input markets are major barriers to fertilizer use in Sub-Saharan Africa (2008: 21, 55).

In assuming the efficiencies of market-based agriculture, the WDR juxtaposes an inefficient peasant agriculture (measured by income generation) against highly efficient agro-industrial operations, and hence, as an impediment to meeting economic and social development goals. Accordingly, the WDR reproduces the narrative that the green revolution bypassed Africa, resulting in a concurrent food crisis. Or, in other words, because Africa lacks modern technologies and markets, the combination

of 'primitive' agricultural practices and poor soils cannot meet the food needs of Africa's growing populations.[14]

Not mentioned in the WDR are the ways in which the colonial restructuring of African economies, and subsequent development policies geared towards export agriculture have created and maintained inequalities and degraded local ecologies. The Malthusian trope of population growth and resource scarcity is invoked as a barrier to productivity gains. However, Malthusian framings, focusing on the relationships between population growth and a shrinking resource base, homogenize people and practices across time and space, abstracting social relations and global power differentials. Although the biological base of agriculture is being undermined, presenting clear biophysical limits, it is not the result of an abstract global population, but of historically constituted uneven distribution and consumption patterns coupled with extractive forms of production. These relationships underlie the intensification of environmental degradation, which is now directly informing and reshaping development discourse as Wolfgang Sachs claims:

> What is new, in fact, is that the North is less and less protected by spatial and temporal distances from the unpleasant long-term consequences of its action…The more the rate of exploitation increases…the faster the finiteness of nature makes itself felt on a global scale. Since the distance in time, which for so long bolstered industrialism against its effects, is shrinking, the biophysical limits of nature have forcefully emerged in the present (1997:292).

[14] In addition to the problematic framing of Africa as being 'bypassed' by the green revolution, this framing ignores the failures of the green revolution in Asia. Behind the 'success' story of India's green revolution, is a tragic and hidden story of debt, despair, and a suicide epidemic. In India the introduction of biotech seeds and high cost chemical inputs resulted in massive smallholder debts (Shiva 2000). The increased cost of production leaves smallholder agriculturalists vulnerable to failed harvests and low market prices. Increased debt and precarious livelihoods of farmers in India has tragically resulted in rising farmer suicides (*ibid*). Although green revolution technologies have proven to provide large productivity gains in the short term, examples from around the world show after these initial gains, yields begin to fall even with increased inputs (Gliessman 2000; Altieri 1995). Since the price of genetically engineered seeds are far greater than conventional seed and necessitate other agrochemical inputs to create optimal conditions, farmers are dependent on agribusiness and risk bankruptcy if yields do not meet expectations.

The WDR's framing of poverty, food insecurity, and ecological crises, pits technology against nature as the only viable solution. It assumes that hunger is inevitable because of laws of nature, and that the interrelations between resource scarcity and hunger are natural processes of creating equilibrium. Furthermore, Malthusian framings conjure up the 'tragedy of the commons' hypothesis whereby humans have a natural propensity to overexploit common lands, and thus, the rights of subsistence must be subordinated and transformed into formalized property rights. The WDR's reductionist framing of hunger, poverty, and ecological degradation reduces political problems into technical problems, and places responsibility for poverty as well as food, energy, and climate crises firmly in the global South.[15]

In addition to market-based and Malthusian assumptions, revealed in the WDR's framing of agriculture, is the constant employment of the modernization dichotomy of developed and underdeveloped countries, which implies that a lack of development is the cause of hunger and poverty. The next section interrogates these assumptions within the WDR and investigates the implications of such framings.

State-Based Growth and the Reproduction of Modernist Ideas of Agriculture and 'Development': Framing Crises as a Lack of 'Development'

Although the WDR's proclamation that "it is time to place agriculture afresh at the center of the development agenda" suggests a revalorization of agriculture, its reliance on modernization theory reflects a continued subordination of agriculture to industry

[15] Market-based and Malthusian discourses shape policy options and allow the World Bank (and other development 'experts') to prescribe technological solutions. Such conceptualizations legitimize the introduction of US and European Agribusiness and green revolution technologies into the agricultural sector of 'developing countries'. In other words, the discursive veil provides cover for western capital. In the case of Egypt, the World Bank funded the Agricultural Mechanization Project for the purchase of equipment and expertise from US agricultural corporations. Roughly 42% of US economic assistance, $6.3 billion, was spent either in the US or to US agribusiness contractors (Mitchel 1991:32). Although International development agencies couch agricultural mechanization projects in humanitarian discourse, they are largely subsidies to corporations, and the results of these projects rarely resolve the 'problem'.

(2008: 1). Even the title of the report, "Agriculture *for* Development," implies that agriculture, while discursively re-centered, is still conceptualized as the servant to (industrial) development; a stepping stone on the path towards modernity. Similar to Rostow's stage theory of modernization, the report's foundational assumption is that peasant agriculture is the 'baseline of development' (McMichael 2009d). This schematic is apparent in the WDR's categorization and hierarchical ranking of three types of countries: 'agriculture based countries,' 'transforming countries,' and 'industrialized countries.' Implied throughout the report is a linear, evolutionary (or natural), progression from 'agriculture-based countries' to 'transforming countries" and eventually, 'industrialized countries.'[16] From this vantage point, the poverty of peasants and smallholder agriculturalists is an *a priori* condition, a product of their agrarian life. In other words, the WDR conceptualizes peasants as relics of an impoverished primitive past, lacking modern technology, development investments, and markets. In creating these stages, poverty becomes a natural condition of agrarian communities.

The WDR highlights "success" stories to demonstrate the progression from agriculture-based countries to industrial countries. The WDR explains,

> Agricultural growth was the precursor to the acceleration of industrial growth [in China], very much in the way agricultural revolutions predated the industrial revolutions that spread across the temperate world from England in the mid-18th Century to Japan in the late 19th Century (2008: 25).

Here, the WDR misconstrues history in creating a comparable development model across time and space that reinforces a narrative of national-based evolutionary progress, independent of external factors. In lumping China, Japan, and England within the same 'model' of development, the WDR conflates the historical

[16] Agricultural based countries are also referred to in the report as poor, underdeveloped, or developing, and industrial countries are also referred to as high-income countries.

specificities, neglects world-historical conditions, and contextual details that might explain the specific conditions of, and variations between, these countries. As McMichael puts it, "The problem with this representation of history is that it compounds the misconstruction of a nationally organized social division of labor between agriculture and industry for each era (2009d: 238). The WDR assumes that industrial development is an autonomous state-based phenomenon, and in doing so neglects the world historical relations that shaped the dynamics within these countries. For example, to overlook the relationship between England's colonial empire and its industrial growth is to fundamentally neglect world historical dynamics, such as the global division of labor under British imperial rule that provided raw materials for England's mills and cheap food for factory workers (McMichael 2009d). It also masks the violent dispossession of peasants and craftsmen preceding England's industrial revolution (Wood 2002, Polanyi 2001).

"There is no unique route," according to the WDR, "for a country to move from an agriculture-based to an urbanized and eventually to a high-income country" (2008: 30). Although the WDR suggests there are numerous "routes" of development, the stages are predetermined, linear, and progressive. Stating that 'developing countries' eventually become 'high-income countries,' the WDR reproduces the teleological assumptions of modernization theory, in which the assumed end goal of this evolutionary progression is the consumer society typified by the US and Europe. In doing so, the WDR perpetuates Eurocentric conceptions of development against which all other countries are measured.

The WDR's repeated assertion that agriculture has a declining significance in national GDP as countries develop assumes a natural (state-based) progression and shift in importance away from agriculture towards industry. This assumption demonstrates the market fetishism inherent in the WDR, which de-values non-

marketized relations, such as subsistence agriculture, that are not calculated in GDP. The construction of GDP (as a measurement of development) reifies the national economy as the object of growth, fetishizes economic growth, and invisibilizes non-marketized relations. As such, the WDR envisions economic growth in which state policies are geared towards creating a 'good investment climate' for agribusiness to establish input and output markets as a way to commercialize smallholder agriculture. Likewise, public expenditures are promoted to help facilitate market access for smallholders, by investing in infrastructure. For instance, the WDR purports,

> Improving and modernizing the marketing system can increase market efficiency, foster competitiveness with imports, and reduce losses and risks. Market modernization, beyond improving basic transport, includes marketing information systems, commodity exchanges, and price-risk management (2008:153).

This passage implies that if the appropriate institutional arrangements are set up by developing states ('modernizing market information, transport, management), then the country will be ready for market liberalization and connecting to global value chains through the 'new' high-value agriculture.

When the WDR proposes placing agriculture at the center of the development agenda, it is important to ask what type of agricultural investments are being promoted and by whom? The answer to these questions is explicitly addressed in the section titled "Agribusiness for development." In this section, the WDR outlines a corporate-led conception of agricultural development based on integrating smallholders into global value chains. In the words of the WDR,

> Agribusiness is the off-farm link in agrofood value chains. It provides inputs to the farm sector, and it links the farm sector to consumers through the handling, processing, transportation, marketing, and distribution of food and other agricultural products. Thus, there are strong synergies between agribusiness and the performance of agriculture for development. Dynamic and efficient agribusiness spurs agricultural growth. And a strong link between agribusiness and smallholders can reduce rural poverty (2008: 135).

The 'agriculture for development' agenda can easily be confused with the 'agribusiness for development' agenda. Hidden behind the rhetoric of helping smallholder agriculture is the goal of commercializing farmers by integrating them into value chains. State interventions are only proposed to facilitate the transition towards a liberalized economy, and the presumed gains of international comparative advantage. An insert on Uganda's strategy for implementing an 'agriculture for development' agenda provides an insight into the WDR's vision of a successful agrarian transition. The report states of Ugandan policy:

> The Plan for Modernizing Agriculture is Uganda's strategy to reduce poverty by increasing rural household incomes, food security, and employment, and by transforming subsistence agriculture to commercial agriculture…The plan is based on the vision of using agriculture for development and progress has been steady, but slower than expected. Institutional change is slow, always challenging, not easily observed, and underappreciated, making the deepening of reforms difficult…Despite slow progress in a number of areas, the Plan, overall, is emerging as a success (2008: 249).

The "emerging success" of Uganda's agriculture for development agenda is explicitly stated: the commercialization of agriculture via the 'slow progress' of institutional reform. The WDR applauds Uganda's neoliberal policy turn and its stated goal of instituting a national policy of depeasantization, presenting a paradoxical conceptualization of the role of the state in national agricultural development. While the WDR emphasizes the role of the state, it simultaneously promotes private sector governance of agricultural markets and global value chains. What, then, is the assumed role of the state? After two decades of neoliberal development policies, epitomized by the structural adjustment regime at the World Bank, the capacities of states to regulate national economies has been greatly undermined by transnational capital. In a period when capital became the organizing force behind global markets, states (and citizens) were increasingly disciplined by the

demands and expectations of transnational capital (Gill 1995). Indebted countries in the global South were forced by SAPs to open their markets to transnational capital. World Bank loans were premised on conditions that states prioritize earning foreign currency for debt payments (including export agriculture) at the expense of public welfare. Furthermore, neoliberalization pressured states to reduce labor and environmental standards, privatize public utilities, state functions, land, and other resources, in pursuit of foreign direct investment. While neoliberalization opened new avenues for capital accumulation, these processes deepened global inequalities (Wade 2004; Harvey 2005). As for agriculture, market liberalization further entrenched processes of depeasantization as smallholder farmers faced competitive pressures from subsidized agroindustrial operations in the global North (McMichael 2004).[17]

Therefore, the WDR's repeated refrain that the role of the state is to create a 'good investment climate' (or sometimes, 'good business environment') reproduces the neoliberal development assumption that markets and transnational capital are the appropriate paths for national development. However, this contradicts the WDR assumption of autonomous state-based growth. Since neoliberal development policies favor the free movement of transnational capital over national development initiatives, the economic outcomes of development processes are predicated on transnational linkages and the relative positioning of national economy within the global economy. This approach often leads to the extraction of wealth from national economies as opposed to the development of national industries (Chang 2002). Clearly, the WDR's agriculture for development agenda reinforces, and naturalizes, the international division of labor, where the Global South exports raw materials and luxury agricultural products for consumption in the Global North. As such, states only facilitate the entry of transnational agribusiness to manage input and output markets;

[17] The WDR's approach to smallholder farmers will be elaborated in the following chapter.

through competition large-scale and capital endowed farmers can consolidate economies of scale and exploit their comparative advantage.[18]

The WDR does not problematize corporate led development or the World Bank's role in promoting deleterious development models. After explaining that SAPs were "inevitable due to the debt crisis" (a consequence of the World Bank's development paradigm), the WDR diverts responsibility of the "second generation problems" caused by market liberalization to improper state implementation of liberalization policies and market failures. Explaining the reasons why SAPs did not work, the WDR claims,

> In some places the state's withdrawal was tentative at best, limiting private entry. Elsewhere, the private sector emerged only slowly and partially—mainly serving commercial farmers but leaving many smallholders exposed to extensive market failures, high transaction costs and risks, and service gaps. Incomplete markets and institutional gaps impose huge costs in forgone growth and welfare losses for smallholders, threatening their competitiveness and, in many cases, their survival (2008: 138).

In blaming developing countries, the WDR implies that poverty and hunger is the result of either improper development implementation or a lack of development (as mention previously in the WDR's assertion that the green revolution bypassed Africa). Therefore, one of the clear contradictions in the WDR is that on one hand it calls for a renewed effort among nation-states to 'develop' their agricultural sectors, while on the other hand they are promoting globalized corporate value chains that, in many cases, supersede the authority of national governments under a neoliberal trade regime. The WDR argues, "linking technological progress with institutional innovations and

[18] Agriculture in the 'developing countries' is perceived as serving, and thus dependent on, European and U.S. consumer demands and supply chain standards as dictated by supermarket retailers. As the WDR states, private interests determine whether to invest based on "potential profitability" and as a result, the whims of capital trump the ability of states to control national economies, stripping them of the ability to genuinely support small-holder agriculture (2008: 150).

markets to engage this diverse set of actors is at the heart of future productivity growth… Building input markets must go hand-in-hand with building output markets and linking farmers to those markets" (2008: 153). This highlights the contradictions of basing development policy around a theory of state-based development in a neoliberal context where capital organizes the global economy, often disciplining states. In the dominant neoliberal model, value is increasingly concentrated in corporate links of global commodity chains as opposed to generating nation-based economic growth. The WDR promotes conditions in which transnational capital maintains hegemonic control over the allocation of value thereby limiting the ability of nation-states to advance policies that would effectively retain value within national borders. The WDR envisions an agrarian transition in which transnational agribusiness will meet global food, energy and climate security by integrating peasants into corporate supply chains, displacing inefficient peasant production.

In his study of a ten-year span of World Development Reports, Paul Cammack argues that the World Bank's discourse of poverty reduction is couched in a larger project to advance global capitalist expansion. With regard to the World Bank's stated commitment to poverty reduction, Cammack notes,

> While the Bank's commitment to poverty reduction is real, within limits, it is conditional upon, and secondary to, a broader goal. Its principle objective is the systematic transformation of social relations and institutions in the development world, in order to generalize and facilitate proletarianization and capitalist accumulation on a global scale, and build specifically capitalist hegemony through the promotion of legitimating schemes of community participation and country ownership (2004: 190).

Cammack's insights regarding the World Bank's efforts to globalize neoliberal practices are also evident in the most recent WDR's stance on agriculture. Although the WDR promotes a 'sustainable' agrarian transformation in the global South, this transformation is envisioned within a capitalist framework, extending the capital and

energy intensive agro-industrial model and subordinating food and energy sovereignty.

CHALLENGES TO THE "AGRICULTURE FOR DEVELOPMENT" AGENDA: IAASTD AND THE PROBLEMATIZATION OF THE AGRO-INDUSTRIAL MODEL

The publication of the 2008 WDR was timely, coinciding with the world food crisis and following on the heels of a global assessment of agriculture, the International Assessment of Agricultural Knowledge, Science, and Technology for Development (IAASTD). The IAASTD is a report sponsored by the UN Environment Program, Food and Agriculture Organization, and Development Program; UNESCO; Global Environment Facility; and the World Bank, and involved more than four years of research from over 400 experts (Ishii-Eiteman and Ching 2008). Its central argument is that the ability of farmers in developing countries to produce sufficient food, feed, fuel, and fiber, while maintaining environmental services, is being undermined by the social and ecological consequences of agro-industrialization and the subordination of locally resilient food systems to globalized markets. The report calls for a dramatic shift in how agriculture is viewed by development institutions and national governments and suggests a re-centering of agriculture that prioritizes ecologically sound practices, local and national markets over global markets, and embraces the multiple functions of agriculture by supporting smallholder agriculture and locally embedded agroecological knowledge.

Whereas the WDR frames "underdevelopment" (meaning the 'lack of development') as a central cause of poverty and ecological degradation, the IAASTD sees misguided development models as a central cause of contemporary ecological and social crises. As stated therein,

> The drivers of ecological change can best be understood as the consequences of development models pursued over the 20th century. Broadly conceived, the regional imbalance of economic growth, its

> contribution to the ecological crisis and its effects are differentially experienced in countries of the North and the South. There are multiple causal interlinkages between environmental degradation and poverty, which are exacerbated by the uneven distribution of and access to resources (natural resources, capital, information, etc.) between regions and within countries. For instance, small island nations and the coastal populations of developing countries, which contribute the least to global warming, will be among the first to disappear, yet have very limited if any capacity or resources to respond to such crises (2008: 21).

Instead of taking poverty as a given condition and disconnected from power relations, the IAASTD focuses here on the production of inequalities through uneven development processes, both between and within countries. 'Market failures' are not presumed to cause poverty, rather politically and historically constituted patterns of "uneven distribution of and access to resources" (2008: 21). While the WDR consistently uses Malthusian framings, which naturalize the relationship between poverty and ecological degradation ('the vicious cycle'), the IAASTD politicizes the historically constituted relationships between the global North and South that condition both poverty and ecological degradation. As such, it places a greater burden and responsibility on the global North for the reproduction of food insecurities and climate change.

The IAASTD problematizes the productivist paradigm espoused by the WDR and its insistence on increasing agricultural productivity via technological innovation. In contrast, the IAASTD observes, "the substantial number of hungry and malnourished people in [North America and Europe] indicates that more production does not necessarily equate with hunger reduction" (2008: 21). By raising the issue of hunger in North America and Europe, the IAASTD problematizes the assumption, implied throughout the WDR, that the 'high income' countries in the North symbolize the highest stage of development and that productivity gains can reduce inequality and hunger. In fact, the 'unintended consequences' of the agro-industrial model, as well as

the knowledge production that undergirds this model, are a central problem according to the IAASTD:

> Agriculture and the knowledge systems that are relevant to the sector now face an impasse. There are tremendous achievements in science and production, yet some of the unintended consequences of these very achievements have not been sufficiently addressed. To address these consequences it is important to account for the prevalent inequalities that characterize relations between regions and countries as well as within them (2008:18).

The IAASTD does not assume that productivity gains will address the issue of hunger. Underlying the problem of hunger is deepening inequalities – both intra- and inter- regional disparities. Furthermore, the IAASTD problematizes the productivity gains realized via green revolution technologies

> …the widespread realization that despite significant achievements in our ability to increase agricultural productive capacity to meet growing demand, we have been less attentive to some of the unintended social and ecological consequences of our technological and economic achievements. We are now in a better position to reflect on these costs and to outline policy options to meet the challenges ahead of us, perhaps best characterized as the need for food security under increasingly constrained environmental conditions and globalized economic systems (2008: 30).

Moreover, in contrast to the WDR, the agro-industrial model of development is not presumed to be a sustainable model for African development. As stated in the IAASTD, "environmental goals are important globally despite pressure on the environment due to relatively high industrialization, urbanization and productivity enhancing agricultural practices in North America and Europe, and pressures to enhance productivity even at the cost of environmental goods and services in Sub-Saharan Africa" (2008: 21). Of primary concern in the IAASTD is the treatment of social inequalities, both intra- and inter-nationally. As noted therein, many of the regional assessments "indicate that the unequal distribution of resources is a major constraint that shapes development needs and impedes the achievement of all other

development and sustainability goals" (2008: 22). By historicizing poverty as a partial condition of uneven development and historically constituted inequalities, the IAASTD turns a critical eye toward dominant development models and their role in creating global ecological and social change. In a world characterized by "asymmetric development, unsustainable natural resource use, and continued rural and urban poverty," the IAASTD argues that the "consequences of these global changes have the most devastating impacts on the poorest, who historically have had limited entitlements and opportunities" (2008: 18). As such, the IAASTD does not simply blame a lack of modern technologies and market access as the cause of poverty, as argued in the WDR, but rather proposes alternative forms of development based on participatory and democratic principles.

Accordingly, trade is not treated as the universal answer to hunger, poverty, and ecological degradation, since "agriculture has been subject to worsening terms of trade, globally as well as nationally," meanwhile, "the burden of poverty in the sector is incommensurate with the magnitude and range of expectations from agriculture" (2008: 22). The IAASTD argues that historically constituted unequal power relations within the global food economy exacerbate global inequalities. "The current global system," as argued in the report, "pits small-scale, largely subsistence farmers in rainfed agricultures against farmers who during the past century have been assisted to increasingly capture economies of scale by specialization and externalizing social and environmental costs" (2008:18). As such, the ability to address inequalities through market integration is minimal under current global political economic conditions. More important than integrating smallholders into markets, is determining which types of market integration benefits smallholders as opposed to corporate agribusiness.

FRAMING AGRICULTURE IN THE CONTEXT OF MULTIPLE CRISES: IMPLICATIONS OF DIVERGENT EPISTEMES

While contemporary socio-ecological crises are the result of historically constituted power relations culminating in the wake of three decades of neoliberal development policies, the WDR's framing of agriculture neglects and depoliticizes these social relations. Although the WDR frames the food crisis as the outcome of population growth, induced scarcity, market imperfections, and the result of underdevelopment, they neglect the longer historical processes of depeasantization and the global restructuring of agriculture and food systems. From colonialism to neoliberalism, agricultural modernization projects, in their various manifestations, have promoted the industrialization of agriculture (biological simplification and energy/capital intensification) for the purpose of high yielding export production. By imposing competitive forces through the price mechanism of capitalist markets, modernist approaches to development further facilitate de-peasantization and processes of capital accumulation (Araghi 2000; Harvey 2003). The simultaneous growth of slums in the global South and the concentration of market power and wealth in agribusiness are emblematic of both of these processes (Davis 2006; Araghi 2000, Heffernan 2000, Murphy 2008, Harvey 2005). Consistently, development projects have subordinated agriculture to industrial development. Although the WDR argues for pro-poor development and the support of smallholder agriculture, the modernist assumptions upon which they base their development model continues the trend of subordinating agriculture to capital.

While the WDR shows concern for reducing smallholder poverty and meeting food, energy, and climate security, their reliance on neoliberal strategies, including the centrality of global markets, the state's role in facilitating a business environment, and relying on business to coordinate global commodity chains, implies an unstated scenario of continued depeasantization presupposing a 'planet of slums' in which

surplus laborers are completely dependent upon corporate provisioning and market relations (Davis 2006; Araghi 2000). The culmination and mutually conditioning processes of these crises clearly illustrate the contradictions of the dominant development paradigm where the naturalized language of market led growth obscures historical processes and depoliticizes development.

As the WDR's 'agriculture for development' agenda exemplifies, green neoliberal discourse privileges market relations over non-marketized social relations. Although the WDR employs the discourse of sustainability, the report does not question the underlying capitalist episteme through which they propose a sustainable smallholder development agenda. By tying sustainability to a universalizing conception of development premised on unlimited economic growth, the WDR accounts for nature through commercial inputs, payments for environmental services and other market mechanisms, which, in effect, expand the realm of commodity relations (Lohmann 2006; Martinez-Alier 2002, Sachs 1993). Since the social and ecological relations of smallholder farmers are largely outside the realm of commodity relations, these farmers are perceived as impediments to economic growth. By reproducing modernist assumptions, the WDR's 'green neoliberal' development discourse denigrates peasants as the objects, as opposed to subjects, of development (Cooper and Packard 1998; Ferguson 1994). As such, the WDR imposes western technological interventions on peasants as opposed to supporting a peasant-led agenda, as endorsed by the IAASTD.

Discursive framings have material consequences, including implications for development policies as well as political implications with regard to the future and function of smallholder agriculture. The IAASTD's challenge to the WDR's 'agriculture for development agenda' reflects a growing skepticism of the agroindustrial model. In critiquing the validity of dominant development narratives, the IAASTD reflects an epistemic tension in dominant development discourses. The

competing discursive framings of the place and role of smallholder agriculture in development in the WDR and the IAASTD have important implications for development policies and practices. In light of multiple reinforcing social and ecological crises, political struggles are forming around the framing of the causes and consequences of crises, and consequently, the framing of solutions. The IAASTD reflects the seriousness of this moment in stating; "Our perception of the challenges and the choices we make at this juncture in history will determine the future of human beings and their environment" (2008: 21).

The next chapter explores the epistemic differences between the WDR and IAASTD regarding the role of technology, markets, and agribusiness in supporting multifunctional agriculture and smallholder farms. The WDR envisions a privatized system of international food, energy, and climate security managed by corporate conglomerations in which the assumed allocative efficiencies of markets are utilized through corporate managed supply chains to facilitate the multiple functions of agriculture, including meeting energy, food, fiber, feedstock, or carbon sequestration. In contrast, the IAASTD's conceptualization of multifunctionality is premised upon principles of agroecology and food sovereignty in which technological interventions and market solutions are subordinated to the integrity of agroecosystems and local knowledges.

CHAPTER 2
'SOLUTIONS' TO THE CRISES?: THE WDR AND IAASTD ON MULTIFUNCTIONALITY, BIOTECHNOLOGY, AGRIBUSINESS, AND SMALLHOLDER FARMERS

The WDR and IAASTD present two competing visions of agricultural development reflecting different framings of food, energy, and climate crises and the specific roles of agriculture and development in relation to these crises. While both are premised on the promotion of smallholder agriculture[19] and utilizing the multiple functions of agriculture to address contemporary social and ecological crises, the contrasting perspectives on the role of biotechnologies and markets in attaining 'sustainable development' goals expose an epistemic tension within dominant development discourse. In particular, the divergent perspectives between the WDR and IAASTD on technological and market interventions reflect conflicting conceptions of multifunctionality, the future of smallholder agriculture, and food security. Whereas biotechnology and market mechanisms are central to the WDR's conception of multifunctionality, the IAASTD promotes culturally embedded agroecological knowledge as the basis for supporting multifunctional agriculture.

Focusing on the role of biotechnologies and market mechanisms in relation to sustainable development goals (including energy security, climate change mitigation and adaptation, poverty reduction and food security) this chapter examines the epistemic tensions between the solutions proposed in the WDR and IAASTD. While the WDR locates 'sustainable solutions' within the agro-industrial model of development where biotechnologies, agribusiness, and market mechanisms facilitate and coordinate sustainable development, the IAASTD challenges the agro-industrial model of development and lends legitimacy to the principles of agroecology and food

[19] Though, as will be demonstrated further on, there is a difference between the WDR's rhetorical commitment to smallholder farmers and the IAASTD's substantive commitment to this group.

sovereignty within dominant development institutions. These contestations over the agroindustrial model of development expose conflicting valuation systems and epistemic assumptions about the future role and function of smallholder agriculture within dominant development discourse. Before contrasting the WDR and IAASTD, I historicize the central role of agro-industrialization in creating contemporary socio-ecological crises as a basis to situate the WDR's "agriculture for development" agenda.

THE RE-EMERGENCE OF AGRICULTURE IN THE DEVELOPMENT AGENDA: HISTORICIZING THE METABOLIC RIFT OF AGRO-INDUSTRIALIZATION AND SITUATING THE WDR

The spatial and temporal reconfigurations of socio-ecological relations in the historical development of capitalism are central to understanding contemporary socio-ecological crises, as well as the ways in which proposed solutions to these crises either reproduce, or challenge, the spatial and temporal logics of capitalist modes of production and distribution. The initial socio-ecological rupture of capitalist development was instigated by the process of primitive accumulation through which capitalist forms of production transformed agrarian relations and initiated subsequent capitalist interventions via processes of agroindustrialization.

Primitive accumulation, according to Marx, was the forceful process of commodifying land and labor through the dispossession of land from peasants, creating both land and labor markets for capitalist production (Glassman 2006). The transformation of labor and land into inputs of production, to be bought and sold according to market prices, was the precursor to capitalist modes of agrarian production in 16th century England. This transformation marked a "rupture in age-old patterns of human interaction with nature in the production of life's most basic necessities" by propelling competitive capitalist relations that intensified the extraction

of surplus value from labor and soil fertility, and instituted the market as the mediator of social reproduction (Wood 2002: 14). As Polanyi wrote about the fictitious commodification of land and labor in nineteenth century, "to include [fictitious commodities] in the market mechanism means to subordinate the substance of society itself to the laws of the market" (2001: 71). The implementation of capitalist market relations was not a natural evolution of society but rather a political project that subordinated non-capitalist socio-ecological relations to market relations, resulting in socio-ecological crises (e.g. pauperization, starvation, and water and air pollution in 19th century England).

Although ecological degradation is not new to capitalism, Marx noted the increasing pace and intensity of ecological degradation as rising urbanization separated labor (via peasant dispossession) from the location of production (the countryside), increasing the spatial distance of production and consumption of food. This spatial separation ruptured the recycling of nutrients in agriculture and created a double environmental problem of declining soil fertility in the countryside and sewage contamination of freshwater in urban centers (Foster 2000). In addition, capitalist relations reorganized the temporal features of agricultural production as profit oriented production provided the impetus for productivity gains, expressed by a reduction of fallow periods, field rotations, and increasingly intensive tillage (Mazoyer and Roudart 2006). The increasing material and energy flows necessary to sustain social metabolism of urban populations, as well as the distribution and recycling of waste were increasingly 'delinked' from the territorial boundaries of the city or congruent rural regions. The temporal features of capital accumulation, based on the continuous drive for profits, subordinated the temporal features of ecological reproduction. Instead of allowing ecological processes to restore soil fertility through periods of fallow, cover crops, agroforestry, or intercropping (which may reduce yields in the

short run, but sustain them in the long run), capitalist modes of agriculture relied on external inputs to artificially maintain soil nutrients and increase short term yields at the expense of long-term sustainability. The ecological contradiction of capitalist temporal and spatial reconstitution of production and distribution, in Marx's terms, signaled a metabolic rift between society and nature (Foster 1999). The expansion of ecological crises to a global scale, according to Moore (2000), was the product of an emerging world-economy in the 16th century which re-organized global ecological relations around the temporal and spatial patterns of capital accumulation.

While the socio-ecological crises in England were initially overcome by extending export agriculture to the colonies (the spatial fix of capital via agro-imperialism), subsequent solutions to declining agricultural productivity relied on technological innovations (or the technological fix of capital). These technological innovations, such as the mechanization of farm equipment and the production of synthetic fertilizers, led to a series of uneven agricultural revolutions across Europe that intensified the exploitation of labor and land. Importantly, the shift from animal and labor power to mechanical and industrial technologies deeply entangled agricultural production with the extraction and consumption of fossil fuel energy. The original development and continued replication of the agro-industrial model was, and continues to be, contingent upon cheap and abundant supplies of energy.[20]

[20] As an example, the US agricultural system is arguably the epitome of energy and capital intensive agriculture. Pimentel calculates that "about 19 percent of the total [US] national energy use" is spent in the production, distribution and retailing of food (2009b:92). This breaks down to approximately 7% for production, 7% for processing and packaging, and 5% for transportation and preparation (*ibid*). In fact, it takes 13 calories of energy to produce each food calorie consumed in the U.S. (*ibid*). Soil and water, the primary elements of agricultural production, have also become a source of energy consumption and waste. The U.S. loses on average 13 metric tons of topsoil per hectare per year (Pimentel 2009b). The energy equivalence to replace these lost nutrients in the form of fertilizers is estimated at 880,000 Kcal per hectare for nitrogen and 440,000 Kcal per hectare for potassium and phosphorus (Pimentel 2009b). Irrigation not only stresses water resources, it requires massive quantities of fossil fuel energy to construct and maintain infrastructure, and to pump and apply water. The maintenance of soil fertility via synthetic fertilizers accounts for the largest portion of energy consumption in industrial agriculture, accounting for 20% of U.S. agricultural energy use. Irrigation pumps also account for 19% of energy consumption in US agriculture (Brown 2006). Globally, Lester

However, the processes of agro-industrialization were, and still are, historically contingent and contested. While the spatial fix of agro-imperialism was met with resistance and relied on the violent appropriation and restructuring of colonial agriculture, the technical fix met biophysical and scientific barriers. Specifically, the biological foundation of agricultural production (or the temporal and spatial specificities of ecologies) presented barriers to the complete industrial transformation of agriculture. As such, the industrial strategies of appropriation and substitution, according to Goodman, Sorji, and Wilkinson (1987), characterize the uneven development of agro-industrialization. Industrial capital, on one hand, appropriates discrete elements of agricultural production and transforms them through industrial processes for the subsequent "reincorporation [of these elements] as inputs for production" (*ibid: 2*).[21] On the other hand, agricultural produce is subject to industrial substitution during post-harvest processing in which agricultural products are the raw material inputs for industrial foods, cosmetics, or other products. "The industrial transformation of agriculture," Goodman et al argue, "has occurred historically through a series of partial discontinuous appropriations of the rural labor and biological production processes and the parallel development of industrial substitutes for rural products" (1987: 2). While most industrial interventions in agriculture before the 1930s were mechanical and chemical (i.e. tractors, synthetic inputs), the advent of hybrid seeds and the subsequent development of the biotechnology industry thoroughly deepened the agro-industrial model.

Brown estimates that the percentage of energy-use from fertilizers is much higher and that for some countries, such as India, irrigation may account for 50% of the agricultural energy bill (*ibid*).

[21] For example, agro-industrialization supplanted animal powered plows for trackers and manures and cover crops for synthetic fertilizers (*ibid*). Whereas non-mechanized corn production takes 1,200 hours of human labor per hectare, a modern mechanized corn operation requires only 11 hours of human labor time or about 110 times less labor time (Pimintel 2009b 99).

The development of Recombinant DNA scientific methods based on Watson and Cricks' 1955 work on genetic coding undergirded the research and development of plant biotechnologies in the early 1970s. These new techniques allowed for greater ability of industrial capitals to appropriate social and ecological production processes of agriculture. The genetic manipulation of seeds allowed biotechnology industries to simultaneously appropriate the production process (by controlling the reproduction of seeds and creating input dependencies) and to exploit new plant traits for the purpose of post-harvest industrial processing (Goodman et al 1987). The biological and political obstacles to the commodification of seeds were overcome by the corporate appropriation of the scientific and technological innovations of public research institution (which overcame biological barriers) and through favorable legislation (political barrier), which granted patents for genetic material, bestowing the legal privileges of intellectual property rights to the seed industry (Kloppenburg 2004). While the risk of legal sanctions against farmers collecting their own seeds upheld corporate property rights, the biotechnology industry, in collaboration with university researchers, also developed the 'terminator' gene, a transgene that renders seeds sterile, as a way to control the production process and incorporate farmers into circuits of capital (the technological treadmill). The genetic engineering of seeds illustrates Kloppenburg's statement that "the appropriation of nature becomes a means for the subjugation of the social world" in that seeds are positioned at the nexus of both social and ecological reproduction and their commodification necessitates a rupture of both the ecological and social relations they embody (2004: 318). Because of the centrality of seeds in the production process, the development and expansion of genetically engineered seeds has become a central corporate strategy for extending the agro-industrial model and reproducing patterns of capital accumulation.

As the remainder of this chapter will demonstrate, the WDR's 'agriculture for development' agenda advances the agro-industrial model and strengthens the corporate food regime by promoting a marketized notion of agricultural multifunctionality that paradoxically exacerbates energy, food, and climate crises by extending commodity relations and displacing locally situated knowledges. A marketized notion of multifunctionality has two central characteristics. First, it assumes the centrality of markets as *the* mode of organizing production, distribution, and consumption of multiple environmental and social needs and services. Food, energy, and environmental crises are attributed to productive inefficiencies, technological limitations, or ineffective political organization (i.e. as an impediment to free market functioning), thus concealing the role of capitalism as a source of these crises. Accordingly, the second feature of marketized multifunctionality is the emphasis on technology as a solution to food, energy, and environmental crises. Biotechnology, for instance, is presumed to increase the fungibility of agricultural products for transformation into food, fuel, or fiber while the expansion of markets for biofuels, carbon, and environmental services offer new avenues for capital investments.

However, the WDR's emphasis on corporate-driven economic development undermines the stated goals of reducing smallholder poverty and supporting sustainable agriculture (specifically harnessing the multiple functions of agriculture to promote food, energy and climate security). In this vision, there is no future for peasant agriculture except either to be integrated into corporate value chains or to migrate out of agriculture – two of the three 'pathways out of poverty.'

EPISTEMIC TENSIONS AND THE 'PLACE' OF AGRICULTURE: COMPETING VIEWS OF MULTIFUNCTIONALITY, BIOTECHNOLOGY, AGRIBUSINESS, AND SMALLHOLDER AGRICULTURE

The WDR on Multifunctionality, Biotechnology, and Agribusiness

One of the stated goals of both the WDR and the IAASTD is to use agriculture to serve multiple functions in society, including food and energy security, reducing poverty, and mitigating climate change. However, their conceptions of operationalizing multifunctionality with regard to these stated goals are fundamentally different.

In the WDR's conception of multifunctionality, the market – as facilitated by agribusiness – coordinates agro-inputs that ensure climate adaptation, productivity gains, and fungible products to meet multiple functions in agriculture and output markets for the transformation, allocation, and distribution of fuel, food, fiber, carbon, or environmental services. Central to the 'agriculture for development' agenda is the idea that "the private sector drives the organization of value chains that bring the market to smallholders and commercial farms" (2008: 8).[22] In the forward to the WDR, Robert Zoellick, President of the World Bank, identifies the key drivers of the agriculture for development agenda. As he states,

> rapidly expanding domestic and global markets; institutional innovations in markets, finance, and collective action; and revolutions in biotechnology and information technology all offer exciting opportunities to use agriculture to promote development (2008: xiii).

While the WDR constructs poor smallholder farmers and "less-favored areas" as objects for development, technological intervention and market-integration are the

[22] The Bank reproduces neoliberal discourse when it claims; "the private sector drives the organization of value chains that bring the market to smallholders and commercial farms. The state – through enhanced capacity and new forms of governance – corrects market failures, regulates competition, and engages strategically in public-private partnerships to promote competitiveness in the agribusiness sector and support the greater inclusion of smallholders and rural workers. In this emerging vision, agriculture assumes the prominent role in the development agenda" (2008: 8).

primary means and end of the WDR's agrarian transition. This conception privileges agriculture's economic functions, especially the extension of agribusiness, above all other functions. The WDR's promotion of biotechnology and market integration implies that genetic modifications of seeds can unlock the social, environmental, and economic potentials of agriculture, and that market signals guide the allocation and distribution of food, fuel, and environmental services as facilitated through corporate value chains.

For the WDR, biotechnology is the avenue for making agriculture multifunctional. Biotechnology, in this model, holds the promise of mitigating climate change, increasing food production, producing renewable energy, and reducing smallholder poverty while simultaneously reducing agriculture's ecological footprint.[23] Productivity gains via biotechnology are a prominent feature of the 'agriculture for development' agenda. In the Bank's own words:

> The world is poised for another technological revolution in agriculture using the new tools of biotechnology to deliver significant yield gains. Already100 million hectares of crops, or about 8 percent of the cropped area, are sown with transgenic seeds…biotechnology applications using genomics and other tools are not controversial, and their declining costs and wider application should ensure continuing yield gains through better resistance to disease and tolerance for drought and other stresses (2008: 67).

According to this logic, the production of drought and disease resistant plant varieties through biotechnology allows smallholders to increase their income via productivity gains. The emphasis here is on the necessity (and purported benefits) of marketizing agriculture. Using Bt cotton in India as a model of success, the report claims that biotechnologies "have the potential to enhance the competitiveness of

[23] "With growing resource scarcity," the WDR claims, "future food production depends more than ever on increasing crop yields and livestock productivity" (2008: 67). In the Bank's framing, "the world food supply requires close monitoring and new investments to speed productivity growth, make production systems more sustainable, and adapt to climate change" (*ibid*: 69).

market-oriented smallholders…" (2008: 158). The benefits and potential of these technologies are framed as a "win-win-win" situation: according to the WDR, "[transgenic insect-resistant cotton] has reduced yield losses, increased farmer profits, and greatly reduced pesticide use for millions of smallholders" (*ibid:158*). In this analysis, biotechnology was the 'magic bullet' that allowed Indian cotton farmers to profit *and* save the environment simultaneously. Biotechnologies, as argued in the WDR, can make agriculture more resilient and can achieve social and ecological goals by increasing productivity.[24]

The WDR argues that "continuing progress" in developing sustainable agriculture entails "extending benefits of R&D to agriculture-based countries and less-favored regions…[and that] these technological innovations…must be combined with institutional innovations to ensure that input and output markets, financial services, and farmer organizations are in place for broad-based productivity growth" (2008: 176). Accordingly, biotechnology is central to achieving the multiple goals of sustainability, climate mitigation, and reducing poverty through productivity gains, but must be accompanied by "building input [and] output markets and linking farmers to those markets" (2008: 153).[25] Following from this logic, the WDR views agriculture predominantly in its productive and economic capacity. Sustainable agriculture is

[24] As stated therein, "The low productivity of most less-favored areas requires major new technology breakthroughs to secure profitability, reverse resource degradation, and improve livelihoods… Improved pest and disease resistance is particularly important to stabilize yields and make farming systems more resilient" (2008: 193).

[25] The WDR explains, "Progress in improving seed and fertilizer distribution systems will not be sustainable, however, unless there is strong, effective demand for both inputs, assured only as long as investment in seed and fertilizer is profitable for farmers. That will be the case only if they have access to reliable markets for selling their products at remunerative prices. Building input markets must go hand-in-hand with building output markets and linking farmers to those markets" (2008: 153). And later in the report, the WDR says, "Continuing progress, especially in extending benefits of R&D to agriculture-based countries and less-favored regions elsewhere, depends on research in these environments for improving crop, soil, water, and livestock management and for developing more sustainable and resilient agricultural systems. These technological innovations, often location specific, must be combined with institutional innovations to ensure that input and output markets, financial services, and farmer organizations are in place for broad-based productivity growth" (2008: 176).

conceived of in reductionist and mechanical terms where inputs and outputs can be substituted and manipulated to meet specific goals. Therefore, drought resistant seeds, biofortification, zero tillage production, and precision agriculture are some of the WDR's proposals to maximize the multifunctionality of agriculture via biotechnology.[26] Problematically, these "sustainable" farming techniques are capital intensive relying on the extension of agro-industrial input and output markets. Since one of the primary functions of tilling soil in agro-ecosystems is to disturb the reproductive cycle of invasive weeds (a form of weed management), 'zero tillage agriculture' relies on other methods of weed management, specifically increasing the use of herbicides and herbicide resistant genetically engineered seeds.[27] This is consistent with the WDR's repeated assertion that "the green revolution has been one of the major success stories of development," and hence, the WDR's plan to extend this "slow magic" to Africa (2008: 159). The green revolution, according to the WDR, enhanced the multifunctionality of agriculture as it "met the world's demand for food and reduced hunger and poverty [and] by dramatically slowing the expansion of cultivated area, agricultural intensification has also preserved forests, wetlands, biodiversity, and the ecosystem services provided" (2008: 180).

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[26] "Other knowledge-based improvements in management that are win-win for farmers include using pest-resistant varieties, better timing and application of fertilizer and water, precision farming (using geographic information systems) and low-tillage farming" (2008: 188). The WDR also claims that "Biofortification is enhancing staple crop varieties and improving diet quality with higher levels of vitamins and minerals through conventional crop-breeding and biotechnology…[and that] In the future, agriculture will continue to play a central role in tackling the problem of food insecurity. It can maintain and increase global food production, ensuring food availability. It can be the primary means to generate income for the poor, securing their access to food. And through new and improved crop varieties, it can improve diet quality and diversity and foster the link between food security and nutrition security" (2008: 95).

[27] Tilling practices serve many functions in traditional and small-scale agroecological management systems. In contrast, large-scale monoculture farming employs tilling practices that degrade soils and release carbon (Gliessman 2000; Pretty 2006, 2002; Altieri 1995; Altieri and Nichols 2009). Thus, focusing promoting zero tillage for smallholder farmers is not only misguided, but also environmentally harmful.

The WDR proposes a number of so-called 'win-win situations' that are premised on technology transfers (genetically engineered seeds) and new markets for environmental services,[28] including the extension of carbon trading to agricultural practices. In calling on the international community to "climate-proof the farming systems of the poor," the WDR prioritizes productivity gains through the development of drought resistant seeds, and increasing smallholder incomes through carbon trading schemes and payments for environmental services. For example, the 'win-win' strategies of technological transfers are supposed to allow "poor African farmers" to increase yields on marginal and degraded lands, preserve the environment, and create new agro-input markets for agribusiness. In sum, the WDR prescriptions for mitigating and adapting to climate change do not historicize the root causes of the problem, including the deepening metabolic rift of agro-industrialization[29] which increases the spatial distance between production and consumption of food (a combination displacing farmers and growing urban slums) and intensifies the temporal features of production by replacing natural cycles with fossil fuel derived agro-inputs, increased deforestation for monoculture commodity production (largely to feed livestock, but also for agrofuels), and the historically constituted patterns of resource extraction from the global South that undergirds the energy intensive high-consumption lifestyles in the global North. Consequently, the WDR does not deal with 'ecological unequal trade' and the global North's carbon debt (Martinez-Alier 2002). While the accumulation of carbon dioxide in the atmosphere is disproportionately a result of ecologically destructive forms capitalist development in

[28] "Some [less-favored lands], especially upland and forest areas, also protect watersheds, regulate water flows in major river basin ecosystems, sequester large amounts of carbon above and below ground, and are host to a rich array of biodiversity. Few of these environmental benefits are valued in the market place" (WDR 2008: 190).

[29] Including energy-intensive food systems in which agro-industrial food production consumes large amounts of fossil fuel derived inputs as well as releases carbon in the form of deforestation caused by expanding monoculture production and the fossil fuel consumption of transporting food internationally.

Europe and the US and corresponding resource imperialism which fueled economic growth and reproduced capital accumulation, the proposed technological and market fixes proposed in the WDR not only obscures these historical processes, but also reconstitutes them as a form of green capitalist development.

Furthermore, focusing on technological interventions devalues tacit knowledges of peasant farmers and their abilities to adapt to climatic variability through agroecological farming techniques. The technological fix relies on corporate agribusiness and market solutions that disembed economies from the cultural knowledge necessary for dealing with ecological change. While traditional agro-ecological practices sustain ecological processes through historically constituted cultural knowledges of local environmental conditions, technological interventions proposed in the 'agriculture for development agenda' express a western scientific hubris (where the superiority of western technology is assumed) and promotes a uniform and universal solution to ecological crises. From this standpoint, agriculture is perceived as a mechanistic process of inputs and outputs disembedded from cultural relations and local ecosystems, and thus, multifunctional agriculture is a technical challenge that can be achieved through biotechnologies. In contrast, culturally and ecologically embedded knowledges have been, and continue to be, a foundation for resilient and multifunctional agro-ecosystems (Altieri 1995; Gliessman 2000; Pretty 2006, 2002; Netting 1993).[30] Thus, the Bank's proposal to address climate change by integrating peasant farmers in global commodity relations, either by instituting the technological treadmill or incorporating them in the carbon market, displaces historically and culturally constituted knowledges of smallholder farmers, which are crucial to sustainable, multifunctional agriculture that can restore ecological processes.

[30] For examples of sustainable agro-ecosystems based on traditional knowledges and practices see Gliessman 2000, Altieri 1995, Pretty 2006, Rosset 2000, and Netting 1993.

Although the WDR recognizes the environmental problems of intensive and extensive agriculture, it frames these problems as the result of "failures to manage externalities," as opposed to a systematic problem inherent in the agro-industrial model. As such, the WDR recommends further marketization of agriculture, including the privatization of productive resources, in order to deal with environmental problems (2008: 195).[31] Even in countries with "poor agroecological conditions" the WDR argues, "agricultural intensification will also be critical for reversing the degradation of natural resources, especially land and forests, as basis for sustainable agricultural growth," and that poverty reduction will "depend increasingly on the poor connecting to these new growth processes, either as smallholders or as laborers" (2008: 35-36). In encouraging intensive agriculture, the WDR's model of multifunctional agriculture recycles fundamental problems as solutions. As such, the WDR gives backing to the corporate food regime in which agribusiness coordinates the production and distribution of agricultural services, including food, fuel, carbon sequestration, and other environmental benefits. For the WDR, the functions of agriculture – whether food, fuel, or climate mitigation – are characterized by their monetary exchange values, in which agriculture produces a wide range of commodities that can and should be valued within the market.

[31] "Getting the incentives right," according to the WDR, "is the first step towards sustainability. Improving natural resource management in both intensive and extensive farming areas requires removing price and subsidy policies that send the wrong signals to farmers, strengthening property rights, providing long-term support to natural resource management, and developing instruments to help manage increased climate risks" (2008: 198-99). The incentives that the Bank appears to be talking about here are incentives for the adoption of new technologies. As they say in the proceeding paragraph, "Better technologies and better ways of managing water and modern farm inputs are now available to make intensive farming more sustainable" (2008: 199). What are lacking in their eyes are the appropriate market mechanisms for the transmission of these technologies. Accordingly, "overcoming environmental problems in agriculture requires a good understanding of private incentives of individual resource users and ways to manage resources more successfully from society's point of view. Many factors affect private incentives for managing resources, including information, prices, subsidies, interest rates, market access, risk, property rights, technology, and collective action" (2008: 181).

Accordingly, the marketized conception of multifunctionality presented in the WDR intensifies the metabolic rift of agro-industrialization by encouraging the commercialization of smallholder agriculture in which smallholder farmer practices and knowledges are replaced with genetically engineered seeds (and other agro-inputs) and are integrated into corporate values chains that distribute ecological services through carbon markets, specialty foods for European consumers, or biofuels for automobiles.

The IAASTD on Multifunctionality, Biotechnology, and Agribusiness

> *By definition, the principle of multifunctionality in agriculture refers to agriculture that provides food products for consumers, livelihoods and incomes for producers, and a range of public and private goods and services for citizens and the environment, including ecosystem functions* (IAASTD 2008: 23).

In contrast to the WDR, the IAASTD views food sovereignty, local knowledges, and agroecological management as foundational to multifunctional agriculture and key to the development of sustainable livelihoods, energy, and ecosystems. As a concept, food sovereignty provides alternative principles for agrarian reform that, first and foremost, conceptualize food as a human right and food and agricultural systems as culturally and geographically situated public goods (as opposed to market commodities). The principles of food sovereignty are rooted in a multifunctional conception of agriculture where the goals of agricultural development are to provide "adequate, affordable, healthy, tasty, and culturally appropriate food" for everyone via local markets and production, supporting the livelihood options for smallholder farmers, and to achieve "sustainable long-term management of productive natural resources (soil, water, genetic resources and other biodiversity) by rural peoples themselves" (Rosset 2006:68).

While the IAASTD does not denounce market integration, it views market-oriented agriculture as subservient to food sovereignty and the maintenance of agroecosystems.[32] These differences are evident in the IAASTD's assessment of the green revolution and its conceptualization of agriculture, reflecting an epistemological break with the WDR. The IAASTD argues,

> The formal [agricultural knowledge, science and technology] system is not well equipped to promote the transition toward sustainability. Current ways of organizing technology generation and diffusion will be increasingly inadequate to address emerging environmental challenges, the multifunctionality of agriculture, the loss of biodiversity, and climate change. Focusing [agricultural knowledge, science and technology] systems and actors on sustainability requires a new approach and worldview… It also requires a new approach in the knowledge base… (2008: 30).

In addition, the IAASTD argues that the "energy intensive and environmentally taxing" agro-industrial models will, in time, "both exacerbate demand for limited resources and damage long term productivity" (2008:45). This de-centering of the agro-industrial model serves as the starting point from which the IAASTD develops its conception of multifunctionality in agriculture as a means of meeting multiple contemporary crises. In contrast to the technological reductionism presented in the WDR, the IAASTD calls for a shift to a new knowledge base within formal agricultural science that includes "the revalorization of traditional and local knowledge" as well as, "an interdisciplinary, holistic and system-based approach to knowledge production and sharing" (2008: 30).

Specifically, multifunctionality depends on "local and traditional strategies for *in situ* conservation" according to the IAASTD, which "can be highly effective in managing the viability and diversity of seed, roots, tubers and animal species over

[32] "Formal AKST has typically focused on increased specialization of commodity production and not on optimizing the outcomes from dynamically evolving multifunctional systems involving biophysical and socioeconomic components" (IAASTD 2008: 23).

generations," and in turn provides "local options and capacity for adaptive response that are essential for meeting the challenges of climate change" (2008:71). In divergence to the WDR's call for agricultural intensification via biotechnologies and agro-input markets, the IAASTD promotes local management of "agroecosystems that both improve productivity and replenish ecosystem services" (2008: 45). In fact, the IAASTD claims that "agroecosystems of even the poorest societies have the potential through ecological agriculture and IPM[33] to meet or significantly exceed yields produced by conventional methods, reduce the demand for land conversion for agriculture, restore ecosystem services (particularly water), reduce the use of and need for synthetic fertilizers derived from fossil fuels, and the use of harsh insecticides and herbicides" (2008:43). Far from the technological optimism presented in the WDR's idea of a marketized multifunctionality, the IAASTD views the practices and knowledges of local people to be central to obtaining a multifunctional agriculture.[34]

Accordingly, sustainable agriculture in the IAASTD is premised upon the long-term health and functioning of agroecosystems and the culturally embedded knowledges that maintain these systems. As such, agro-industrial technologies play a secondary and subordinate role in the maintenance of ecological integrity. The IAASTD's sustainability principles diverge from the WDR by promoting a reduction of agrochemical inputs, efficient use of energy, water, and land ("not only as in precision agriculture, but also as in agroecology"), diversification of agricultural systems, "agroecological management approaches," the "internalization of the environmental costs of unsustainability," and supporting "traditional and local

[33] Integrated Pest Management.
[34] In premising its conception of multifunctionality on local knowledge, the IAASTD argues, "Traditional and local knowledge co-evolve with changes in their material and non-material environment. Any internal and external forces and drivers that threaten the loss of the material basis of traditional and local cultures and identities necessarily threaten traditional and local knowledge" (2008:78).

technical knowledge to manage soil fertility, crop and livestock genetic diversity and conserve natural resources" (2008: 29).

The IAASTD states its concerns about the ability of "modern biotechnology" to meet social and ecological goals as it has "developed in too narrow a context to meet its potential to contribute to the small and subsistence farmer," and that "[bio]technologies in and of themselves cannot achieve sustainability and development goals" (2008:42). Furthermore, the IAASTD argues that biotechnology and the privatization of seed systems threaten to undermine multifunctionality and local knowledge that are foundational to food security. The report argues,

> As privatization fuels a transfer of knowledge away from the commons, there is a contraction both in crop diversity and numbers of local breeding specialists. In many parts of the world women play this role, and thus a risk exists that privatization may lead to women losing economic resources and social standing as their plant breeding knowledge is appropriated. At the same time, entire communities run the risk of losing control of their food security (2008:44).

This analysis problematizes the role of agribusiness in creating social and ecological crises, implying that corporate-led development strategies reinforce unequal global power relations via processes of accumulation by dispossession. Instead of assuming that poverty, hunger, and ecological degradation are caused by a lack of technology and market integration, the IAASTD reverses the equation, arguing that, in part, food insecurity and ecological degradation are a product of technological and market interventions through which corporations appropriate common resources and knowledges.[35] Therefore, while the WDR places support behind technological

[35] As stated in the IAASTD, "The uneven distribution of productive natural resources coupled with the lack of access to resources and fair markets for small-scale producers and women in agriculture, results in extreme inequality and increasing poverty…millions of poor people and women in much of [the global South] contend with unequal production and market relationships on a daily basis. Current inequality is exacerbated by the fact that [North America and Europe] dominate agricultural and rural development resources as well as formal knowledge generation in [agricultural knowledge, science and technology]. For example, businesses within [North America and Europe] have a powerful impact on global consumer demand; they obtain and profit, directly or indirectly, from commodities, landraces

interventions and western agribusiness, the IAASTD subordinates the interests of agribusiness to local communities and agroecological sustainability. Stating its concern over the "potential genetic contamination in centers of origin," the IAASTD endorses the precautionary principle with regard to biotechnology as a starting point for development policy (2008: 30).[36] As stated therein, of central importance is,

> Democratically evaluating existing and emerging technologies such as transgenic crops, first and second generation biofuels, and nanotechnologies to ascertain their environmental, health and social impacts. Long-term assessments are needed for technologies that require considerable financial investment and risk to adopters, such as biotechnology and Green Revolution-type technologies (high external inputs). It is important that impacts and applications of alternative technologies are also examined and that independent comparative assessments (i.e., comparing transgenic with currently available agroecological approaches such as biological control) are conducted (2008: 29).

This position contrasts starkly with the WDR's 'agriculture for development' agenda, whereby the superiority of western technologies and the need for external intervention is presumed. The IAASTD argues for the democratic rights of farmers and farming communities to determine the appropriateness of technologies. Moreover, the practices and knowledges of smallholder farmers are given priority over technological interventions in order to achieve social and ecological objectives in development policy. Importantly, these principles espoused in the IAASTD provide legitimacy to development alternatives premised on the local control of food systems.

The conflicts apparent in both the assessment and proposed solutions of the WDR and IAASTD reflect competing epistemic positions within dominant development discourse. In implicating the 'development industry' and corporate agribusiness in the

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and other valuable genetic resources (stored ex situ in other countries), beneficial organisms for biocontrol programs, immigrant labor and have legal and institutional capacities such as intellectual property rights, standards and market regulations… (2008: 24).

[36] The report recognizes the "importance of assessing both the potential environmental, health and social impacts of any new technology, and the appropriate implementation of regulatory frameworks as a principled matter of precaution" (2008: 30).

production and perpetuation of smallholder poverty and proposing a revalorization of smallholder agroecological knowledge as the basis for multifunctional agriculture, the IAASTD poses a sharp critique of the WDR's 'agriculture for development' agenda. These epistemic tensions are further exposed in how both reports envision the place and role of smallholder agriculture in meeting development goals and addressing contemporary crises.

The WDR on Smallholder Agriculture

In contradiction to the WDR's proclaimed promotion of 'win-win' strategies for smallholder agriculture and the environment, the WDR's proposed extension of the agro-industrial model, characterized by energy- and capital-intensive export agriculture, sanctions depeasantization via accumulation by dispossession. Accumulation by dispossession, as a methodological lens of historical capitalist transformations, illuminates the various ways that specific historical moments of capitalist development forcefully or coercively incorporate non-capitalist social relations, as well as the appropriation of public assets, into global commodity relations as a strategy for reproducing capital accumulation (Harvey 2003; Glassman 2006). The transformation of social relations to commodity or market relations entails a disembedding of markets from their social and material basis (Polanyi 2001). The WDR's agriculture for development agenda endorses the commercialization of smallholder agriculture by tying farmers to agro-input and output markets, and also encourages other farmers (ones that are out-competed by 'entrepreneurial farmers') to migrate to urban areas as a pathway out of poverty (proletarianization). As a result, the 'agriculture for development agenda' espouses transforming social and ecological relations of smallholder farmers into commodity relations for purposes of economic growth (capital accumulation). This model necessarily presumes the "successful

migration out of agriculture" (WDR 2008: 8) whereby peasants are viewed as inefficient barriers to growth and the productive efficiencies of agribusiness are believed to serve as a vehicle for 'sustainable' economic growth.

The WDR continually promotes the so-called "new agriculture" that exploits high-value export crops in horticulture, livestock, and vegetables as a way to capture the growth potentials of new markets and meet specialized consumer demand in Europe. Changing international tastes, the WDR claims, "open new markets for a wide range of higher-value agricultural products and propel the evolution of the marketing system in many developing countries, with the entry and rapid growth of supermarket chains and the food processing and food service industries" (2008: 124). Additionally, the WDR recommends that agricultural-based countries focus on "agro-based clusters" where firms in specific geographical areas coordinate and compete in servicing dynamic international markets such as the market in non-traditional exports, or the "new agriculture" (2008: 211). By continuing to espouse export-oriented development strategies, the WDR's proposal for agricultural growth is premised upon the exploitation of the international division of labor, where agriculture-based countries of the global South realize their 'comparative advantage' (cheap land, labor, and resources) by exporting raw materials and food for consumption in the industrialized countries in the global North.

One of the 'new dynamic export markets' the WDR supports is the global market in biofuels. Although the WDR cautiously supports biofuel projects (acknowledging some of the political controversies[37]), the WDR argues that with technological advances, biofuel production can open new markets for smallholder farmers while meeting energy security and mitigating climate change. In their words, "promising new opportunities for mitigating climate change and creating large new markets for

[37] Such as diverting food crops for fuel, resulting in an increase in food prices.

agriculture have emerged through the production of biofuels, stimulated by high energy prices" (2008: 17). Specifically, the WDR argues that advances in biotechnology, which can improve the efficiency of converting feedstock into fuel, and creating market incentives through carbon trading, are the key factors for meeting the energy and climate potentials of agriculture. As such, the WDR's position on biofuel production epitomizes their marketized conception of multifunctionality, upon which the future of smallholder agriculture is dependent and marginal to the creation of corporate managed input and output markets.

The contradictions between the WDR's stated goals of supporting smallholder agriculture and their reliance on the agro-industrial model are particularly evident in its focus area titled "Agribusiness for Development." While the WDR articulates its concern over corporate concentration and argues for the creation of small and medium size agribusinesses to stimulate wealth generation in the countryside, it neglects to mention how processes of consolidation and concentration occur, especially during a time when neoliberal policies facilitate the internationalization of capital, which transcends boundaries and supersedes the ability of states to regulate national economies. During the post WWII international food regime, agriculture in developing countries was restructured towards agro-exporting of specialty crops and importing food staples from heavily subsidized and increasingly concentrated grain corporations (Friedmann 1990, 1992; McMichael 2004).[38] Subsidy regimes and international trade policies facilitated this international trend of corporate consolidation and food dependency such that four corporations currently dominate the global grain market: Cargill, Bunge, ADM, and ConAgra control 80% of global grain

[38] Many countries with high levels of food insecurity are often exporters of luxury foods or tropical commodities, such as the countries that constitute Central America, export coffee, sugar, pineapples, banana, cocoa, and beef, yet food insecurity and hunger persist in these countries (Tucker 2000; Faber 1993).

trade (Heffernan 2000; Murphy 2008). This corporate food regime has no allegiance to national development or public welfare, but is instead driven by the uneven geography of demand and profits. Corn ethanol refineries and the seed industry in the US are also good examples of corporate consolidation. Both started with small and medium size businesses, but as the technology and markets were established large agribusiness capitals bought out these small businesses and consolidated both of these industries (Murphy 2008; Heffernan 2000; Kloppenburg 2004). While the WDR argues that "linking the local economy to broader markets by reducing transaction costs, investing in infrastructure, and providing business services and market intelligence are critical" to the establishment of agribusiness, it does not support state interventions in regulating foreign corporations (2008: 18). Creating agribusiness initiatives in the global South by design creates in-roads for transnational capital. As the markets for agro-inputs are dominated by US and European corporations, the WDR's proposal for creating a good investment climate implies that agricultural-based countries should subsidize the entry of transnational capital by constructing the demand for agro-chemicals as well as market infrastructure to facilitate agricultural exports. The expansion of proprietary genetically engineered seeds, in particular, creates input dependencies amongst smallholder farmers, as genetically engineered seeds rely on the simultaneous application of fertilizers and pesticides in order to maximize yields.[39] Incorporating smallholder farmers into corporate-dominated input and output markets instigates accumulation by dispossession as the productive resources and associated knowledges of smallholder farmers are substituted with capital-intensive external inputs.[40]

[39] For more on impacts of biotechnology with regard to global North/South relations, see Kloppenburg 2004, and Pistorius and van Wijk 1999.
[40] While small and medium size business will accrue all the entrepreneurial risks, agribusiness will consolidate the successes (Amanor 2009).

The WDR makes two admonitions that expose the unstated reality of the 'agriculture for development' agenda. First, the WDR acknowledges "economies of scale in the "new agriculture" are often the key for obtaining inputs, technology, and information and in getting products to the market (2008: 91). As agriculture becomes more technology driven and access to consumers is mediated by agroprocessors and supermarkets, economies of scale will pose major challenges for the future competiveness of smallholders" (2008: 91-92). Secondly, the WDR acknowledges that attracting private investments for agro-input and output markets "depend on the potential profitability of these activities" (2008: 150). The WDR's support of the 'new agriculture' based on high-value exports is thus contingent upon the ability to attract foreign capital. This includes tying smallholder farmers into circuits of capital where farmers obtain loans to purchase improved seeds, fertilizers, and pesticides, specialize in monoculture production of one export crop, and sell their produce through corporate value chains. Yet integrating farmers into competitive international markets and increasing their reliance on capital-intensive agro-inputs, in tandem with instituting privatized land markets facilitate the consolidation of land into the hands of wealthy farmers (or what the WDR calls 'entrepreneurial farmers') as market-based competition pits smallholder farmers against large-scale farmers.

The WDR admits, "not all smallholders will be able to farm their way out of poverty. For those with limited access to resources and market opportunities, improving productivity in subsistence agriculture can allow them to secure their food consumption and health and *eventually* move into market-oriented farming or other, more remunerative jobs" (2008: 234, emphasis added). Here, the WDR condones the process of differentiation through which the competitive forces of market mechanisms pit smallholder farmers against one another. Capital endowed farmers are presumed, and encouraged to consolidate land by out competing other smallholder farmers. In

the words of the WDR, "heterogeneity in the smallholder sector implies that a group of entrepreneurial smallholders is likely to respond when markets offer new opportunities. Improved access to assets, new technologies, and better incentives can allow more smallholders to become market participants in staples and high-value crops" (2008: 92).

Consistent with dominant approaches to market integration, the WDR's proposed productivity revolution and export-led 'new agriculture' implies the transformation or eventual elimination of smallholder farms. As the WDR bluntly argues, agricultural policies should pursue "multiple pathways out of poverty, [including] shifting to high-value agriculture, decentralizing nonfarm economic activity to rural areas, and *providing assistance to help move people out of agriculture* (2008: 2, emphasis added). As clarified in the WDR's promotion of the commercialization of smallholder agriculture and corporate led development, the 'agriculture for development' agenda assumes that smallholder farmers are impediments to economic growth (as noted above). The proliferation of industrial agriculture effectively replaces human labor and local knowledge with mechanization, biotechnology, and industrial chemicals, further deskilling and devalorizing smallholder agricultural practices. By extending commodity relations via market integration into global value chains and the creation of agro-input markets, the WDR promotes a global corporate food regime that deepens and expands the historical processes of depeasantization via accumulation by dispossession.

The IAASTD on Smallholder Agriculture

> *Small-scale farmers, particularly women, play a key role in promoting sustainable methods of farming based on traditional knowledge and practices. Women often possess knowledge of the value and use of local plant and animal resources for nutrition, health and income in their roles as family caretakers, plant gatherers, home gardeners, herbalists, seed custodians and informal plant breeders. Moreover,*

women often experiment with and adapt indigenous species and thus become experts in plant genetic resources (IAASTD 2008:78).

As illustrated in the above excerpt, the IAASTD has a very different conception of the relationship between smallholder agriculture, development, and the environment. By arguing for a "democratization of knowledge production" moving beyond 'formal science' to include "the local and traditional knowledges…" it poses an epistemic challenge to the hegemonic position of the agro-industrial model within dominant development discourse (2008: 17). The report also calls for "moving away from a linear technology transfer approach," that predominantly benefited medium and large-scale farmers to the detriment of small-scale diversified farmers and multifunctional agriculture, and instead moving development policy towards engaging smallholder farmers in "priority setting and funding decisions" (2008:31). Whereas the WDR focuses on external interventions to increase smallholder productivity and multifunctionality, the IAASTD views the cultural knowledges and practices of smallholder farmers as central to creating appropriate policies and solutions to social and ecological crises. The report argues for policies that "enable resource-poor farmers to use their traditional and local technical knowledge to manage soil fertility, crop and livestock genetic diversity and conserve natural resource," including adjusting intellectual property rights "to allow farmers to manage their seeds and germplasm resources as they wish" (2008: 29). Posing an epistemic challenge to the WDR's promotion of corporate-managed agro-input markets, the IAASTD espouses the rights of farmers to own and control the means of production that are essential to their livelihoods and agroecological functioning.

As opposed to the deregulation of national agricultural policies for the purpose of inducing foreign investments (as the WDR supports), the IAASTD encourages an active regulatory state that upholds and defends the interests of smallholder farmers

and the environment against the unregulated expansion of agribusiness and biotechnologies. The IAASTD calls on states and international institutions to "protect small-scale farmers from unfair competition including from often subsidized commodities produced under conditions of economies of scale," as well as to provide protection against proprietary agribusiness by "creating or strengthening conditions that can guarantee farmers' rights to choose, select, and exchange seeds that are culturally and locally appropriate," and by removing the "monopoly privileges" granted to seed corporations through intellectual property regimes (2008:32). In contrast to the WDR's recommendation of privatizing land tenure and other productive resources, the IASSTD argues that land reform policies should better understand and uphold "communal ownership" and "communal exchange" systems (2008: 32). The IAASTD recommends land reform to promote smallholder-diversified farms as a way to address the "displacement of small-scale farmers, *campesinos* and indigenous people to urban centers or to marginal lands in the agricultural frontier" (2008: 32). In this vision, supportive smallholder policies ensure the rights of communities and farmers to access land and productive resource and protect these rights from corporate privatization schemes. Supporting smallholder-diversified agriculture serves as the basis for meeting future sustainability and social justice goals.

While food security for the WDR entails market integration and increasing productivity via technological interventions, the IAASTD views food security as dependent upon the promotion of smallholder agriculture and the maintenance and reproduction of local agroecological knowledge. As such, it encourages development agencies and agricultural research institutions to "value farmer knowledge, agricultural and natural biodiversity, farmer-managed medicinal plants, local seed systems, and common pool resource management regimes" (2008: 26). Likewise, the

IAASTD recommends the "empowerment of women as repositories of knowledge about local ecosystems" within development policy as a way to support knowledge-based multifunctionality, which is "fundamental to development and to adapting to a changing environment" (2008: 21). Here, farmer knowledge along with local and community controlled food systems are central to the IAASTD's vision of agricultural development. As opposed to the technological and market interventions proposed by the WDR as a way to differentiate the countryside, the IAASTD envisions a central and important role of smallholder farmers in addressing social and ecological crises, arguing that the challenge today is to retool agricultural knowledge science and technology to improve the "livelihood options for the rural poor – especially landless and peasant communities…" (2008: 22). Importantly, these recommendations validate the principles of food sovereignty in which communities have the right to determine their own food systems based on cultural and ecological integrity.

In promoting "participatory and democratic approaches" to knowledge, science, and technology, including the development of "innovative local networks" and institutional reforms that "enable formal [agricultural knowledge, science and technology] to partner effectively with small-scale producers, women, pastoralists, and indigenous and tribal peoples,"[41] the IAASTD unsettles the epistemic foundation of the WDR's 'agriculture for development' agenda (2008:30). While the 'agriculture for development' agenda assumes a uniform and linear development trajectory in which (western) technological and market based interventions transform and differentiate the peasantry (into either commercial farmers or wage laborers) on the path towards industrialization, the IAASTD problematizes these premises by encouraging development agencies to recognize and learn from the "skills of local producers" and to recognize "multiple theoretical frameworks and development

[41] "… who are sources of environmental knowledge" (IAASTD 2008:30).

models," including "a wide range of options" outside of the current agro-industrial model (2008:18, 21). The IAASTD proposes to implement this shift in development practice by supporting the "institutionalization and affirmation of traditional and local knowledge" within national, regional, and international policy making frameworks (2008: 73). The principles of food sovereignty play a central role in this schema, as illustrated by the support of a number of countries and projects that "have developed strategies… to institutionalize and affirm traditional and local knowledge for the combined goals of sustainable agricultural modernization, natural resource management, social justice and the improvement of well-being and livelihoods" (*ibid: 73*).

The WDR's Agriculture for Development Agenda: Interests and Implications

Based on Malthusian and market-based assumptions of development (described in Chapter One), the WDR promotes green revolution technologies as a response to hunger and food insecurity. This has been a long-standing strategy of the World Bank, along with development agencies and practitioners at large (for elaborations, see Lappé et al 1998; Mitchell 2002; Goldman 2005; McMichael 2004). It is no coincidence that this technical approach to agricultural development has the support of US and EU agribusiness, as these corporations continuously seek new markets for their agro-inputs and investments for research and development of new technologies. However, the technological interventions of green revolution projects (namely the use of synthetic fertilizers, pesticides, and insecticides as well as the machinery to improve efficiency) have a poor environmental and social track record, including the contamination of fresh water, increased soil erosions and soil salinity, human and animal chemical exposure, reduction and contamination of ground water. (Kimbrell 2002; Holt-Giménez 2006; Gliessman 2000). Agricultural modernization projects in

the global South, such as the green revolution in Mexico and India, instigated processes of farmer differentiation as differential access to agricultural inputs and technology exacerbated economic disparities enabling large and capital-intensive farms to outcompete and displace small and medium scale farmers (Altieri 2009; Holt-Giménez 2006). In sum, the market framings of the WDR misconstrue both the problems and solutions to contemporary social and ecological crises, and conceal "the relations and processes underlying the corporate appropriation of agriculture" (McMichael 2009b: 284). Rather than creating energy, food, and climate security, the WDR's "agriculture for development agenda" entails the subordination of food and fuel sovereignty to market integration. The WDR's conception of multifunctionality, following the logic of green capitalist ideology, subordinates socio-ecological and culturally embedded knowledges by encouraging the commercialization of smallholder agriculture. Likewise, the WDR's support of utilizing biotechnology to increase the fungibility of agricultural commodities to increase multifunctionality reveals the ways in which the WDR sanctions the corporate food regime.

While the WDR sanctions the extension of the agro-industrial model of production via a corporate food regime (premised on increasing dependence on cheap fossil fuel energy), the IAASTD problematizes the continuation of both the agro-industrial model and the dominant development paradigm. The problem, according to the IAASTD, derives from an epistemic failure of development thinking as "existing specialization in the global agrifood system coupled with government investments and policies in production and trade, has led to a view of agriculture as an exclusively economic activity, measured in commodity-based, monetary terms" (2008: 23). This problemization of the productivist paradigm is an epistemic intervention that challenges the WDR's conception of food as a commodity and agriculture as a sector for commodity production.

Additionally, the IAASTD destabilizes western scientific knowledge as the dominant and most appropriate form of innovation for agricultural development, as well as uniform notions of progress and development.[42] Instead the IAASTD revalues local knowledge and multiple theoretical and alternative development processes.[43] "We cannot escape our predicament," the IAASTD argues, "by simply continuing to apply methodological individualism, i.e., by relying on the outcome of individual choices to achieve sustainable and equitable collective outcomes" (2008: 17). Here, the IAASTD problematizes the dominant economistic approach to development policy, which places individual rationality (assuming the universality of a profit-oriented market subject) at the center of the development model and argues for a more complex understanding of the interactions between political economic forces and varying cultural perceptions of development, rooted in ecological relations. In arguing that solutions based solely from an economistic episteme will not be able to solve the multiple social and ecological crises we face today, the IAASTD unsettles the very epistemic foundation upon which the WDR is premised.

The IAASTD's emphasis on maintaining and supporting smallholder agriculture also challenges the growth fetishism of the dominant development paradigm, arguing that the predominance of economistic indicators of growth within dominant

[42] The IAASTD challenges the uniform agro-industrial model in arguing that "critical regional differences in agroecosystems, access to formal [science and technology] and diverse impacts on people and ecosystems, pose a challenge to the continuing dominance of a uniform type of formal [agricultural knowledge, science and technology]" (2008: 18).

[43] "An environment in which formal science and technology and local and traditional knowledge are seen as part of an integral [agricultural knowledge, science and technology] system is most likely to increase equitable access to technologies to a broad range of producers. Options to improve this integration include moving away from a linear technology transfer approach that benefited relatively well-off producers of major cash crops but had little success for small-scale diversified farms and poor and marginalized groups and paid little attention to the multifunctionality of agriculture. Improvements are needed in engaging farmers in priority setting and funding decisions, and both in increasing collaboration with social scientists, and increasing participatory work in the core research institutions. Networks among small-scale producers contribute to the exchange of experience and AKST, as do inter- and multidisciplinary programs, cross-disciplinary learning and scientific validation, involving both research and non-research actors, and recognizing the cultural identity of indigenous communities" (IAASTD 2008: 31).

development institutions is a main culprit of contemporary social and ecological crises. The social and ecological crises are symptomatic of an epistemic crisis in development theory. As such, the social and ecological crises of agro-industrialization, according to the IAASTD, "[are a] part of an overall development model in which scientific knowledge is institutionalized in its utilitarian role, [and] resources are allocated to production systems that can show the highest economic returns to crop/commodity productivity" (2008:25). In this historical moment characterized by multiple reinforcing crises, the epistemic tension within dominant development discourse is creating a discursive space for agrarian social movements to consolidate viable development alternatives premised on social and ecological justice and sustainability. The IAASTD's challenge to dominant development discourse is, in effect, legitimizing food and fuel sovereignty movements as it calls for a revalorization of smallholder agriculture and knowledges in their own right, rather than as subordinate to national development goals.

Emerging Possibilities

Published at the peak of the food crisis, these reports reflect epistemic tensions within the development agenda. In critiquing the premises of the agro-industrial development model, the IAASTD poses an alternative framing and solutions to these crises. At this historical moment of multiple reinforcing social and ecological crises, the IAASTD illuminates a decline in the legitimacy of market-oriented agriculture within dominant development discourse and an opportunity for development alternatives, such as those put forth by Via Campesina, to establish food sovereignty as a central feature of agrarian reform, the focus of the following chapter.

CHAPTER 3
CRACKS, FISSURES, AND A POLITICS OF EMERGENCE?: ALTERNATIVES TO DEVELOPMENT AND THE NEW AGRARIAN QUESTION

At a historical moment characterized by multiple social and ecological crises, the epistemic tension within dominant development discourse and the material and discursive interventions of corporate agribusiness and agrarian social movements represent a contemporary global 'double movement' (Polanyi 2001).[44] With the legitimacy of the dominant development paradigm under scrutiny, this historical conjuncture opens the discursive space for "reframing the politics of development" and marks a moment of potential transition in the terms, conditions, and practices of the relations between agriculture and development (McMichael 2009c: 142). While the WDR sanctions the discursive and material strengthening of the corporate food regime (exemplified in corporate agrofuel projects), agrarian social movements (such as La Via Campesina, MST, and variations of local food projects) are challenging and reimagining development along the lines of agroecology and food sovereignty. In this chapter I examine two cases – corporate agrofuel projects[45] that reflect the trajectory of the dominant development paradigm, and the food sovereignty movement that reflects the emerging potentials for development alternatives – to demonstrate the logical extensions of the WDR and IAASTD's discursive approaches to agriculture and development. I use corporate agrofuel projects in this final chapter as an illustration of the WDR's conception of multifunctionality, and to draw out the

[44] While Polanyi wrote about the double movement largely within the confines of national borders, the breaching of territorial boundaries by transnational capital and global ecological crises (exemplified by climate change) and the rise of transnational social movements (such as La Via Campesina and the food sovereignty movement), illustrate how the dynamics of a contemporary double movement play out on a global scale.

[45] I use the term 'corporate agrofuels' to distinguish large-scale agrofuel projects and corporate driven agrofuel supply chains from other small scale, local, and/or community-based biofuel projects. Not all biofuels are the same, however, the rapid global expansion of agrofuel projects over the past 5 years, is predominantly a corporate driven process with institutional support, which will be explained in this chapter (See GRAIN 2007).

political and material implications of the agriculture for development agenda. I argue that the marketized conception of multifunctionality espoused in the WDR condones corporate agrofuel projects that utilize new biotechnologies to enhance the fungibility of agriculture to meet emerging market demands for fuel and carbon. In contrast, La Via Campesina illustrates an alternative conception of multifunctionality and agrarian development that extends and amplifies the contestations to the dominant development paradigm presented in the IAASTD. I employ Friedmann's (2005) notion of transitions as a way of interpreting the epistemic and practical possibilities of this historical moment characterized by a global double movement of competing and divergent agrarian development paradigms. Interpreting transitional moments between food regimes, Friedmann argues that new "food regimes emerge out of contests between social movements and powerful institutions" through which new rules and governing principles are negotiated and established (2005: 234). Importantly, in these moments of transition, social movements challenge dominant framings of social reality by naming, and thus making explicit, the implicit and contradictory rules of the hegemonic food regime (ibid: 235). In this chapter, I apply this notion of transitional moments specifically to the struggles over development discourse and practice.

This chapter also addresses the implications of these divergent models of agricultural organization and practice (agro-industrial and food sovereignty) with regard to contemporary reformulations of the agrarian question. In the concluding section, I argue that this moment of potential transition implies a re-framing of the agrarian question in which the social and ecological significance of the 'fate of the peasantry' is becoming a more salient point of political contestation. In politicizing the socio-ecological contradictions of corporate agribusiness, agrarian social movements draw attention to the ecological ('cooling the planet') and social ('feeding

the world') benefits of smallholder agroecological-based farming (McMichael 2008). In contrast to the original agrarian question formulated from the lens of capital accumulation, the new agrarian question, I argue in congruence with McMichael (2007, 2008, 2009e), is being framed through the lens of food sovereignty. Through this reframing, agrarian social movements are politicizing the socio-ecological contradictions of the dominant development paradigm and reclaiming the political subjectivity of the peasantry from theoretical representations of the disintegration and political insignificance of peasant agriculture.

COMPETING VISIONS AND EXPRESSIONS OF A CONTEMPORARY DOUBLE MOVEMENT: THE CORPORATE FOOD AND FUEL COMPLEX AND THE FOOD SOVEREIGNTY

> *[The double movement] can be personified as the action of two organizing principles in society, each of them setting itself specific institutional aims, having the support of definite social forces and using its own distinctive methods. The one was the principle of economic liberalism, aiming at the establishment of a self-regulating market, relying on the support of the trading classes, and using largely laissez-faire and free trade as its methods; the other was the principle of social protection aiming at the conservation of man and nature as well as productive organization, relying on the varying support of those most immediately affected by the deleterious action of the market—primarily, but not exclusively, the working and the landed classes—and using protective legislation, restrictive associations, and other instruments of intervention as its method* (Polanyi 2001:138).

Polanyi employs the concept of the double movement to explain the political project of instituting economic liberalism in 19th century England, and the political resistance ('social protection') to the social and ecological disruptions of free market capitalism. By organizing production through market mechanisms and transforming socio-ecological relations into commodity relations, the capitalist subordination of society to free-market relations, Polanyi dramatically argues, "disjoint[s] man's relationships and threaten[s] his natural habitat with annihilation" (2001:44). As the previous two chapters have demonstrated, the WDR reflects a discursive effort to

institutionalize and expand capitalist relations by extending corporate value chains and the agro-industrial model of production to the global South.[46] However, the capitalist project of disembedding markets from the social and ecological fabric of society, Polanyi argues, is historically contingent on the relative strength of counter movements struggling to 'protect society' and to construct 'alternative organizing principles for society' and development (2001: 138). This historical moment of social and ecological crises and the discursive and material contestations reveal the features of a contemporary double movement, embodied by agrofuel projects of the corporate food regime and the food sovereignty movement. Whereas food, in the corporate agro-industrial paradigm, is a commodity valued in monetary terms, the food sovereignty paradigm conceptualizes food as an embodiment of social and ecological relations central to social reproduction and the sustainability of agro-ecological processes.

In this section, I will first outline the characteristics of emerging corporate food and fuel commodity complexes.[47] In order to assess the extent to which corporate agrofuel projects extend the negative social and ecological consequences of agro-industrialization, I will focus on the expansion of commodity relations and the development of increasingly fungible commodities via biotechnology as well as the consolidation of corporate power in the global food economy by way of mergers, joint ventures, and increasing investments from industrial and energy capitals. In the subsequent section, I will explore the discursive and political interventions of La Via

[46]Polanyi explains how 19th century liberal discourse reframed social and ecological crises as a lack of economic liberalism as a way to legitimate further free market reforms. He says, "The materialistic fallacy in regard to the nature of social and cultural catastrophe thus bolstered the legend that all the ills of the time had been caused by our lapse from economic liberalism" (2001:169). Similarly, the WDR proposes to transform the socio-ecological relations of smallholder agriculture into corporate commodity relations, thus recycling problems as solutions.

[47] Corporate agrofuel projects serve as an expression of the WDR vision of agrarian transformation including the subordination of agriculture to capital via agro-industrialization and smallholder incorporation into corporate food and fuel value chains.

Campesina and the movement for food sovereignty. These examples express the contours of a contemporary double movement.

THE WDR AND CORPORATE FOOD AND FUEL COMMODITY COMPLEXES

The WDR's depoliticized framings of social and ecological crises and its marketized interpretations of multifunctionality, smallholder agriculture, and food security sanctions the corporate food regime and its agro-industrial model of development in which agribusiness mediates the production and distribution of agro-inputs and outputs. Meanwhile, energy and climate crises, in tandem with prevailing ideologies of green capitalist development, have served as a catalyst for biotechnology companies and agribusinesses as they present agrofuel production as a sustainable development strategy that addresses both energy and climate crises.[48] As growing markets for agrofuel in the global North are creating new avenues for the industrial transformation of agriculture in the global South, the promotion of corporate-led development and biotechnologies in the WDR's 'agriculture for development' agenda condones emerging food and fuel complexes.[49]

Food and fuel commodity complexes are characterized by corporate control over agricultural research agendas (including large investments by energy and automobile

[48] According to the ADM website (www.adm.com) "Each day, the 28,000 people of Archer Daniels Midland Company transform crops such as corn, oilseeds, wheat and cocoa into food ingredients, animal feeds, and agriculturally derived fuels and chemicals. With crop sourcing, transportation, storage, and processing assets in more than 60 countries, ADM connects farmers' crops with the needs of the global marketplace… The world is expected to consume 55 percent more energy by 2030 than it did in 2005. But with petroleum reserves declining and emissions from traditional fossil fuels increasing, there is a growing needs to draw upon cleaner, renewable, sustainable energy sources to meet rising global demand. Today, biofuels such as ethanol and biodiesel are the only alternative transportation fuels available to consumers, and ADM is a leading producer of both" (10-12-2009). And Dupont claims on their website (www2.dupont.com) "Our mission is to deliver global nutrition through higher crop yields and healthier foods while developing solutions to help meet the world's energy needs" (10-12-2009).

[49] As markets for carbon credits and renewable energy in the global North are established through market-based climate change agreements, corporate agrofuel projects are expanding in the global South. See Holt-Gimenez and Shattuck 2009, and McMichael 2009b for more on the expansion of agrofuel production in the global South.

corporations at public universities), corporate alliances between agribusiness, energy and automobile industries (via joint ventures, collaborative partnerships, vertical and horizontal consolidation), and biotechnological innovations that create fungible commodities and extend the commodification of nature through research and development of second generation biofuels.[50] Corporate agribusiness concentration in all the major first generation biofuel feedstock markets (soy, corn, palm oil, sugar) illustrates the corporate dominance and likely consolidation of global agrofuel markets. For example, with the support of ethanol mandates, Archer Daniels Midland Company (ADM) is diversifying its commodity portfolio into fuels, estimating that a quarter of their profits will come from the agrofuel sector (Philpott 2007). Similarly, Cargill has purchased the largest ethanol distillery in Brazil, and is now the leading exporter of sugar and soy out of Brazil (for food, fuel, and industrial processing). Cargill has also become a major player in Indonesia's palm oil production (see Appendix A for further elaboration). The top 3 corporations in U.S. corn control 80% of U.S. exports while Monsanto, DuPont, and Syngenta dominate the corn seed market (Monsanto holds 41% of global corn seed market).[51] Likewise, the global sugarcane industry is highly concentrated amongst Cargill, Louis Dreyfus, and Cosan. In addition, only a handful of corporations, including Wilmar, IOI, Synergy Drive, and Cargill, dominate the palm oil industry. Bunge, ADM, Cargill, and Dreyfus dominate the global soy trade, and Monsanto and Dupont own a disproportionate share of the global soy seed market (see GRAIN 2007, 2008b). As the main input, storage, and transportation industries, these corporations exert monopolistic control and collect

[50] First generation agrofuels refer to existing agricultural crops, including sugar cane, soy, corn, palm oil, and jatropha. Second generation agrofuels, also referred to as cellulosic ethanol, refer to the conversion of cellulosic material such as grasses, trees, algae, and crop residues into fuel. Currently, biotechnology companies are decoding the genetic information of first and second generation agrofuel crops in an attempt to create plants that are more readily convertible to fuel (Shattuck 2008).
[51] As a result of the structural dynamics of grain markets, when corn prices reached record levels in 2008 farmer income in the U.S. did not parallel the rise of commodity prices (IATP 2008).

profits at both ends of the commodity chain. The expansion of global agrofuel markets offer biotechnology companies new markets for agro-inputs and allow grain trading corporations to hedge agricultural commodities between food, fuel, or other industrial markets. Advances in genetic engineering and new markets for agro-industrial products facilitate the corporate project of extending commodity relations, opening avenues for capital accumulation, and concentrating power within input and output commodity chains. As such, corporate agrofuel projects express the dominant historical logic of the subordination of agriculture to capital in the form of agro-industrialization, deepening the metabolic rift between society and nature.

Since the viability of many agrofuel feedstocks is contingent on biotechnology breakthroughs, agrofuel projects have revitalized the push to genetically engineer crops. Established seed corporations, such as Monsanto, Syngenta, Dupont, Bayer, Dow, and BASF are receiving the largest investments for research and development for agrofuel crops. Currently there are two ways biotechnology is being used for agrofuel development: 1) to increase yields and oil content of first generation feed stocks, and 2) the development of cellulosic, or 'second generation', ethanol (Holt-Giménez and Shattuck 2009). Of the four main first generation commercial agrofuels (corn, soy, sugar cane, and palm oil), corn, soy and sugar cane have already been genetically engineered to withstand Monsanto's round up ready herbicide, and Synthetic Genomics corporation is currently developing commercially viable genetically modified palm oil (GRAIN 2007). The characteristics for genetically engineering first generation agrofuels are predominantly to increase yields or oil content of plants, alter ethanol refinery byproducts so it can be used as livestock feed, to engineer pesticide resistant seed varieties, or to genetically alter plants to withstand abiotic factors such as drought, salinity, and other poor soil features (for the purpose of growing energy crops on marginal lands) (*Ibid*). Renessen, for example, is a joint

venture between Cargill and Monsanto that developed Mavera corn seed that includes transgenes to produce higher oil content for ethanol refining as well as lysine, an essential amino acid, for livestock feed (Shattuck 2008). Mavera corn, produced by Cargill and Monsanto, demonstrates how agribusiness is creating closed loop corporate systems in which agribusiness sells agro-inputs to farmers, purchases the harvest for industrial transformation into ethanol and then meat. By genetically engineering abiotic tolerant seeds, genetically engineered agrofuels expand the territorial range of agribusiness into 'so called' marginal lands. Either through the appropriation of common or public lands, termed marginal, or by incorporating marginalized smallholder farmers into corporate supply chains, genetically engineered agrofuels displace or subordinate smallholder farmers (Cotula, Dyer, and Vermeulen 2008). Since, resource poor farmers and indigenous communities often utilize so-called marginal lands to meet their livelihood needs, the framing of 'marginality' in both the WDR and corporate discourse obscures the corporate appropriation of agriculture, and the subordination of the ecological and social valuation systems of the poor to economistic calculus (Martinez-Alier 2002).

Capital investments by oil, automobile, and agribusiness corporations are also going towards public-private partnerships for the research and development of genetically engineered agrofuel crops. Oil corporations are one of the primary investors in research and development of genetically engineered fuel crops, tightening the relationship between energy and agribusiness industries through collaborative projects.[52] Some of the world's largest oil corporations are collaborating to fund

[52] Once antagonistic towards ethanol production, Big Oil companies are now heavily investing in the production and processing of agrofuels (Krauss, NY Times, March 26, 2009). Brent Erickson, the executive VP Biotechnology Industry Organization told the New York Times, "[a]ny time you get Big Oil into the game, that changes the paradigm because nobody can go large scale chemical engineering like Big Oil" (2009: 1). In other words, the financial support of oil corporations provides the capital base to propel a full scale research and development program for agrofuels. For example, British Petroleum (BP) has invested $1.5 billion on agrofuel, joining with small start up companies, and also

research agendas in public universities, including a $500 million grant from BP to UC Berkeley, a $22.5 million agrofuel research program at Iowa State University funded by Conoco Phillips, and research alliances between Chevron and UC Davis as well as the U.S. Department of Energy's National Renewable Energy Laboratory. Both Royal Dutch Shell and Total are teaming up with biotech and automobile companies to research second generation feed stocks (Padilla 2007). These public-private research partnerships continue what Kloppenburg (2004) calls the commodification of knowledge and scientific methods through the commercialization of academia (or privatized research agenda). In doing so, capital influences the scientific agenda and process, and ultimately, appropriates the products of research. While private companies invest in market-oriented product research, universities orient their research agendas toward commercially relevant products in order to secure corporate financing. This relationship supports business interests at the expense of other intellectual endeavors, such as small-scale agroecological research.[53] In the case of genetic engineering, the appropriation of public universities by private industry subsidizes and perpetuates the agro-industrial development model, by developing technological interventions that allow agribusiness to appropriate or substitute social and ecological production processes (Bollier 2002). Accordingly, the expansion of corporate agrofuel projects is providing biotechnology companies large investments for the development of new seed varieties and an opportunity to open new markets for these seeds.

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large agrochemical companies such as Dupont. Shell has quadrupled its agrofuel research funding since 2007, Chevron has entered into a number of joint ventures in agrofuel projects, and Valero is busy buying corn ethanol refineries (Krauss, NY Times, March 26, 2009). Other national and private oil companies are investing in agrofuel projects including, Eni, Mitsui, Mitsubishi, Repsol, Titan, Lukoil, Petrobrás (of Brazil), Total, PetroChina, Bharat Petroleum, PT Medco, and Gulf Oil.

[53] Thus, knowledge production increasingly takes the form of commodity production in which universities embrace "an atomized, market-based approach to knowledge production" adhering to 'market' signals and the profit motive (Kloppenburg 2004: 332).

With potentially large financial returns, biotechnology companies are attempting to create commercially viable cellulosic, or 'second generation,' agrofuel feedstocks. The current refining of cellulosic ethanol is energy intensive and capital intensive, and thus, second generation agrofuels are not commercially competitive with fossil fuel energy or first generation agrofuels. Biological barriers to breaking down lignin into starch prevent the easy transformation of cellulose into fuel. For example, research is under way to genetically engineer trees and grasses for lower lignin levels to facilitate the biomass to fuel conversion process (Shattuck 2008). Likewise, fungi and enzymes are being genetically engineered to breakdown lignin so that these fungi and enzymes can digest crop residues or other plant materials in fuel production process (Smolker, Tokar, and Petermann 2008). As such, the rapid investment in second generation agrofuels, including large investments from oil, agribusiness, automobile and airline industries, and through government subsides and grants in the US and EU is spurring a new wave of genetic enclosures, which threatens to expand the commodification of life to any living plant species (including grasses, algae, trees, crop residues, and other plants).

The processes of commodification and the expansion of market relations, according to Polanyi, were the defining characteristics of the capitalist project of disembedding markets from society. Fictitious commodities, Polanyi argued, embodied the central contradiction of free market capitalism, as nature (as well as labor and money), are not commodities produced for markets, but are fundamental to the social and ecological fabric of society. "Production is interaction of man and nature;" he explains, "if this process is to be organized through a self-regulating mechanism of barter and exchange, then man and nature must be brought into its orbit; they must be subject to supply and demand, that is, be dealt with as commodities, as goods produced for sale" (Polanyi 2001: 136). Importantly, the process of

commodification drives and deepens the metabolic rift between society and nature. The commodification of nature and the socio-ecological relations of production subordinates and transforms natural processes (nutrient, water, and energy cycles) to conform to the spatial and temporal features of capitalist accumulation.

Situated in a historical moment characterized by the specter of irreversible climate change and widespread global hunger, emerging corporate food and fuel complexes expose and crystallize the central contradictions of 'green' neoliberal development discourse and practice. Far from mitigating climate change and supporting agrarian development, green capitalism via the food and fuel complex recycles fundamental problems as solutions, reproducing the negative socio-ecological consequences of agro-industrialization. Growing agribusiness profit margins, increasing corporate concentration within agro-input and grain markets, and the growing corporate alliances and capital base undergirding biotechnology research and development for agrofuel feedstocks demonstrates the tightening corporate control over global food and fuel systems (GRAIN 2007).[54] Describing the dynamics of an emerging global food system a decade ago, Friedmann argued,

> Within the limits of international rules, corporate integration of a global agrofood sector has proceeded as quickly and thoroughly as changing technologies permit. A new degree of global sourcing is made possible by feedstuffs that substitute the standard corn and soy combination of the food regime… Rapacious entrepreneurial practices are encouraged by slavish state policies to attract investments and promote exports. The paradise of eternal strawberries and ornamental plants for rich consumers depends on an underworld of social disruption and ecological responsibility (1993: 53-54).

As illustrated in the case of corporate agrofuel projects, biotechnology companies and agribusinesses are capitalizing on development policies and discourse that support

[54] As grain and agro-input corporations consolidate within global food and fuel markets, these corporations dictate prices at the farm gate and retail ends of the supply chain (Heffernan 2000; Murphy 2008). As a result, when commodity prices spiked in 2008, Cargill's profits spiked 67% from the previous year, Bunge increased its profits in the first half of 2008 by 471%, and Monsanto's income was up by 83% during the first three quarters of 2008 (Holt-Gimenez and Shattuck 2009).

increasing corporate manipulation and control of global food and fuel systems. Premised along the lines of the WDR's marketized conception of multifunctionality, agrofuel projects demonstrate the ways in which corporate conglomerates are utilizing genetically engineered seeds and vertically and horizontally integrated supply chains to manage climate, food, and energy security on a global scale. As such, the WDR's objectives of meeting sustainability development goals and economic growth express the subordination of environmental goals to capital accumulation, or new forms of 'green accumulation' (Goldman 2005).

The implication of both the discursive framings of the WDR and material practices of the corporate food regime via agrofuel projects is deepening a global metabolic rift of agro-industrialization. In reproducing the agro-industrial model and market-based approaches to development, the WDR's vision of sustainable and multifunctional agriculture, and its material manifestations, encourages the processes that cause ecological degradation. "The greening of the Bank," Goldman explains, "has only intensified the colonial gaze with which the North views the South, and which has recently come to rest on the environment and those who depend on it most directly as a source of sustenance, broadly defined" (2005: 150). The Bank devalues local agricultural traditions and agroecological practices, in favor of capital-intensive agricultural development. Even though agroecological production is more resilient to environmental stressors, the Bank prefers corporate led strategies. By encouraging the integration of smallholder farmers into corporate value chains, the WDR's agriculture for development sanctions depeasantization.[55]

However, in the face of development contradictions and the social and ecological entropy of the corporate food regime, a transnational counter-movement is strengthening around alternative conceptions of agricultural multifunctionality and a

[55] See Appendix A for a case study of the corporate palm oil complex in Southeast Asia.

new agenda for development premised on the centrality of smallholder agriculture. The epistemic challenge posed within dominant development discourse by the IAASTD, at this historical conjuncture of multiple reinforcing social and ecological crises, is unsettling the legitimacy of the agro-industrial model, and providing a window of opportunity for agrarian social movements to consolidate and establish the principles of food sovereignty as the basis for agrarian reform.

THE IAASTD, LA VIA CAMPESINA, AND FOOD AND FUEL SOVEREIGNTY

> *Food is a basic human right. This right can only be realized in a system where food sovereignty is guaranteed. Food sovereignty is the right of each nation to maintain and develop its own capacity to produce its basic food respecting cultural and productive diversity. We have the right to produce our own food in our own territory. Food sovereignty is a precondition to genuine food security* (Via Campesina, 1996; quoted in Desmarais 2002: 104).

In contrast to the WDR and corporate agrofuel projects, the IAASTD framings, interpretations, and solutions based on agroecology, smallholders, and local control of food systems, open a discursive space for the food sovereignty movement, as represented by the political interventions of La Via Campesina, to establish development alternatives premised on the centrality of peasant agroecological practices and knowledges. Boaventura de Sousa Santos and A. Rodriguez-Garavito explain that the idea of alternative development, "proposes that limits be set [on economic growth] and that such growth be subordinated to non-economic imperatives" (2006: xxxiv). Social movements, organizations, and other groups struggling for development alternatives, according to these authors, place principles of equity, environmental sustainability, and community-control at the center of economic organization and forms of production. As such, struggles for alternative development can manifest in a multiplicity of forms and strategies. While the food sovereignty movement puts up a unified resistance to corporate-led development models, it also

embodies the diversified and multilayered struggle for development alternatives as peasant groups and organizations, which constitute the food sovereignty movement, express a diverse range of culturally and geographically specific forms of production, knowledges, and practices.

The opening quote in this section by La Via Campesina (a transnational federation of peasant organizations) is an early articulation of food sovereignty presented at the 1996 World Food Summit. In this articulation, food sovereignty implies "the right of each nation to maintain and develop its own capacity to produce its basic food respecting cultural and productive diversity" (Desmarais 2002: 104). However, subsequent articulations of food sovereignty move beyond the national focus and encompass a wide range of rights-based claims from the community/local level to regional level, including the right to land, farming, and self-determination (Patel 2005).

At the core of the concept is the re-prioritizing and redefining of agricultural development policies in order to elevate social and environmental concerns above trade and market liberalization. Within this frame, peasant movements are calling for the removal of agriculture from international trade agreements and WTO rules (Rosset 2006). Although the food sovereignty movement does not reject markets, it prioritizes local markets to global markets, rejecting the neoliberal paradigm in which corporations dictate prices. Furthermore, the food sovereignty movement subordinates market relations to socio-ecological relations. As such, the food sovereignty movement calls on local, national, and international policy makers to protect agricultural and food systems from external pressures as well as to democratize policy decisions regarding food and agriculture. These demands include, "dismantling of agribusiness companies" who are appropriating smallholder lands and "creating

environmental disasters…banning all forms of genetic use restriction technologies," and banning subsidies that promote agricultural dumping (Via Campesina 2009: 10).

There is no universal application or blueprint for an agricultural policy based on the concept of food sovereignty because such policies are contextually specific and vary depending on the geographic, historical, and cultural context in which food and agricultural policies are negotiated. Nonetheless, food sovereignty is partially premised on decentralizing and democratizing agrarian policy decisions, redistributive land reform, protection from unfair trade regimes, and support of smallholder and indigenous knowledges.[56] In order to realize food sovereignty and address contemporary social and ecological crises, La Via Campesina argues,

> The necessary forms of organizing and carrying out these forms of agriculture require decentralized tasks and millions of people, communities and organizations involved and making decisions on how to make the change possible. They require a sharp knowledge of local ecosystems and conditions, of seeds and biodiversity. Only small farmers and indigenous peoples around the world can fulfill such needs (La Via Campesina 2009: 18).

In particular, redistributive land reform is stressed as an important step in reversing the trends of land concentration and privatization (in both the colonial and neoliberal eras) and in supporting rural livelihoods and food security (Rosset, Patel, and Corville 2006). For example, Brazil's Landless Workers Movement (MST) is the largest member organization in La Via Campesina and has successfully fought for the permanent settlement of over 350,000 landless families (Wright and Wolford 2003). Accordingly, La Via Campesina claims that true agrarian reform "strengthens small-

[56] According to Rosset (2006) food sovereignty entails a common set of preconditions in order to achieve a just, cultural appropriate and ecologically sustainable agriculture. Firstly, agriculture and food must be taken out of the WTO and the logic of free market capitalism (Ibid). Second, land reform must be implemented to redress historical inequalities in access to land. Third, agriculturalists, fisher-folk, pastoralists, and rural communities have the right, through democratic processes, to determine what type of food system is appropriate for them. Fourth, states must protect against agricultural dumping, and must privilege local, national, and regional markets over export first models of development. Fifth, states must protect and support indigenous and traditional agricultural knowledge (Ibid).

scale farming, promotes the production of food as the primary use of land, and regards food as a basic human right that should not be treated as a commodity" (2009: 7). As articulated in this passage, La Via Campesina and the principles of agrarian reform based on food sovereignty, reflect the social protective movement of Polanyi's double movement. The principles of food sovereignty counter corporate attempts to privatize the means of production and commodify food.

La Via Campesina and the principles of food sovereignty draw attention to and attempt to address historically constructed inequalities. With food as its point of political intervention, the food sovereignty movement is redefining modernity and development from below. According to Escobar,

> Social movements constitute an analytical and political terrain in which the weakening of development and the displacement of certain categories of modernity (for example, progress and the economy) can be defined and explored. It is in terms of social movement discourse that the immediacy of "development," and its foundational role in the constitution of the "Third World" and the post-World War II international economic order, can be more pertinently put to rest (1992: 28).

Accordingly, the discursive and political interventions of the food sovereignty movement open up the possibility of a world not based on goals of hyper-economic growth, privatization, consumerism, and corporate governance, but of an agriculture based on the public good as defined through 'truly participatory' democratic processes. In contrast to dominant development narratives that frame peasant agriculture as a historical relic, unproductive, and a barrier to economic growth, the food sovereignty movement politicizes modernist discourse and appropriates and reconstitutes the meaning of peasant agriculture as agent of an alternative and sustainable modernity. Opposed to framing peasants as the culprits of social and ecological crises (as the WDR implies), the food sovereignty movement frames peasants as the saviors to the social and ecological crises. As La Via Campesina

argues “the solutions to the current crisis have to emerge from organized social actors that are developing modes of production, trade and consumption based on justice, solidarity and healthy communities. No technological fix will solve the current global environmental and social disaster” (2009: 7).

The food sovereignty movement promotes agroecological knowledge and practices of smallholders as a way to address contemporary ecological crises. The growing body of literature on agroecology, traditional agricultural practices, and sustainable production methods, support the claims made by the food sovereignty movement, as it is increasingly evident that small- to medium-scale farms that incorporate ecological management techniques can produce as much food as industrial monoculture agriculture, conserve agro-biodiversity and natural resources, and are more resilient to climatic and market variability (Gliessman 2000; Altieri 1995; Vandermeer and Perfecto 2005; Pretty 2002; Rosset 2000; Holt-Gimenez 2006; Netting 1993). In a recent study, researchers at the University of Michigan argue that organic production techniques can produce as much food as large-scale monocultures, and without expanding the current land acreage under production can feed the current global population (Chappell 2007). As a comprehensive study of the effects of hurricane Mitch on conventional and small-scale agroecological farms in Central America demonstrated, farmers that implement agroecological management on their farms are also more resilient to environmental stress and market fluctuations (Holt-Gimenez 2006; Altieri 1995). Traditional agricultural systems and agroecological practices restore soil fertility by recycling on farm nutrients, store carbon by increasing organic matter, require less water, conserve agro-biodiversity, and are less chemical and energy intensive (Altieri 1995; Gliessman 2000; Pimentel 2009b; Mayozer and Roudart 2006; Pretty 2006).

In arguing for the dismantlement of neoliberal trade regimes and corporate power

and by repositioning smallholder, traditional, and indigenous knowledge at the center of sustainable development alternatives, the food sovereignty movement poses an epistemic challenge to the theoretical and political claims of the disappearance and political insignificance of peasant agriculture (reflected in both development discourse and scholarly debates on the 'fate of the peasantry'). As McMichael argues, food sovereignty is both a critique of modernist and orthodox Marxist representations and of neoliberal development policies that frame peasant farmers as anachronisms (2008). Epistemic challenges within development discourse revolving around the deepening ecological crises of agro-industrialization amplify the contestations from agrarian social movements who are forcing the social and ecological importance of smallholder agriculture to the center of contemporary debates on agrarian change. In light of the mounting global ecological footprint of industrial agriculture, and a growing counter-movement premised on the principles of food sovereignty and agroecology, the epistemic lens and the original political problematics articulated in agrarian question debates must be revisited with a more central socio-ecological lens.

A Politics of Emergence and the "New" Agrarian Question

Conflicting Epistemes and Struggles for Development Alternatives: Peasants as Savior or Culprit?

In a time of multiple crises, the epistemic tensions in the WDR and IAASTD reflect the tenuousness and fragility of the agro-industrial model and a challenge to economistic valuation within dominant development discourse. Growing skepticism around market-led agricultural practices is creating space for alternative conceptualizations and framings of food, energy, and climate crises and the role of agriculture therein. Discussing changes in food regimes, Friedmann explains periods of transition as "periods of unresolved experimentation and contestation" including tensions and contestations within the "ideological and discursive aspects" of

institutional arrangements governing food systems (2009: 335). She argues that "transitional eras are full of multiple possibilities" in which social movements, or other groups or organizations "name" and "offer competing *frames* for resolving" the contradictions of the "delegitimized food regime" (2009: 336). Accordingly, the cracks and fissures within dominant development discourse offer an opportunity for a politics of emergence, whereby social movements advocating food and fuel sovereignty can consolidate as viable development alternatives. The political implications of this historical conjuncture expressed by a contemporary double movement of corporate disembedding and a food sovereignty countermovement are also reshaping agrarian question debates. This final section examines the shifting political terrain and content of the contemporary agrarian question in light of the cracks and fissures in development discourse and a politics of emergence where food sovereignty movements are reconstituting peasant agriculture as development alternatives.

As argued here, the 'fate of the peasantry' is not only a problematic of the capital/labor relation, but also an epistemic and ecological problematic; rather than focusing on capital's reconstitution of the peasantry via full or partial proletarianization, contemporary agrarian movements are reframing the debate around the social and ecological benefits of smallholder agriculture. In politicizing the socio-ecological entropy of the agro-industrial model (which erodes the material basis of social and ecological reproduction), La Via Campesina employs the concept of food sovereignty as a discursive and political intervention into the dominant market-based framings of food security and as a way to revalorize peasant knowledges and agroecological practices necessary for meeting contemporary social and ecological crises.[57] Situating food sovereignty as a founding principle for development

[57] La Via Campesina argues, "Corporate food production and consumption are significantly

alternatives to the agro-industrial model, movements such as La Via Campesina redefine development. Importantly, the food sovereignty movement poses an epistemic challenge to the agrarian question of capital by discursively reconstituting peasantries from marginality to centrality in development discourse, and situating peasant as the agents for building just and sustainable food systems (McMichael 2006, 2009e). By re-appropriating the category of peasant as a way to revalue smallholder agriculture and politicize theoretical and political representations of peasants, the emergence of La Via Campesina and the food sovereignty movement signifies a reclamation of peasant subjectivity from theoretical and political claims of peasant disintegration and political insignificance (McMichael 2008).

Sketching Agrarian Question Debates: The Politics of Agrarian Transformation from Primitive Accumulation to Globalization[58]

According to Bernstein, debates on agrarian transformations and transitions to capitalist agriculture, known as the agrarian question, have traditionally looked at three problematics: 1) "agricultural production, or, what constitutes a transition to capitalist agriculture and what drives it," 2) "contemporary politics, or what is the role of agrarian classes of labor in struggles for democracy or socialism," and 3) "industrial

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contributing to global warming and to the destruction of rural communities. Intercontinental food transport, intensive monoculture production, land and forest destruction and the use of chemical inputs in agriculture are transforming agriculture into an energy consumer and are contributing to climate change. Under neo-liberal policies imposed by the WTO, the regional and bilateral FTAs, as well as the World Bank and the IMF, food is produced with oil-based pesticides and fertilizers and transported all around the world for transformation and consumption. Via Campesina, a movement bringing together millions of small farmers and producers around the World, asserts that it is time to radically change the industrial way to produce, transform, trade and consume food and agricultural products. We believe that sustainable small-scale farming and local food consumption will reverse the actual devastation and support millions of farming families. Agriculture can also contribute to cool down the earth by using farm practices that store CO2 and reduce considerably the use of energy on farms" (2009: 2-3).

[58] The point of this section is to highlight some of the central debates in the agrarian question literature. In attempting to summarize the debates in just a few pages, this sketch obviously misses many of the rich details for the purpose of distilling central points of contention. For a thorough discussion of the agrarian question see Akram-lodhi and Kay 2009.

accumulation, or how transitions to capitalist agriculture contribute to the capital accumulation necessary for industrial development" (2009: 240-241). Central amongst these questions are the structural dynamics of capitalist development and the political tensions that arise from capitalist transitions. As will be explored below, these overly structured analyses within agrarian question literature obscure the socio-ecological relations and valuation systems outside of or marginal to capitalist relations (McMichael 2009e). In addition, the neglect of ecological relations limit the applicability of the 19th century and subsequent framings of the agrarian question to the contemporary moment in which food, energy, and climate crises, and the political mobilizations around these crises, are unsettling the foundations of the agroindustrial model and altering the temporal and spatial assumptions of development and modernity.

Both modernization and (orthodox) Marxist development theories presupposed the displacement or disintegration of small-scale family farms or peasant agriculture on the path to industrial modernity. In the face of capitalist competition and laissez-faire economic policies (first, within a national context, and later, within a global context), the processes of rural class differentiation and land consolidation were theoretically assumed to disintegrate peasant agriculture, freeing labor from the countryside for urban industrialization.[59] Investigating this presupposed process of proletarianization and its consequent demographic shift, Engels also postulated the 'peasant question' in which he questioned the political allegiance of displaced peasantries in the making of

[59] Marx argued that the peasantry in Europe would eventually join the growing ranks of the industrial proletariat due to the contradiction between capitalist modes of production (and development) and peasant agriculture (Akram-Lodhi and Kay 2009, Kautsky 1988). Using the concept of 'primitive accumulation,' Marx illustrated the violent nature of peasant dispossession in the restructuring of the English countryside. From this capital-labor relationship, both Kautsky and Lenin also theorized a general trend of concentration of production in agriculture such that the peasantry would be subsumed into one of two rural classes: capitalist farmers or petty commodity producers.

revolutionary class struggles.[60] Kautsky reformulated this political problematic focusing on the price of food as a point of political tension between peasants and proletariats and an obstacle to forming socialist or social democratic alliances (McMichael 1997).[61] Thus, in the context of the 19th century, the classical agrarian question was a political problematic and a problematic of industrial development, both of which had implications for the persistence or disappearance of peasantries.[62]

For both Kautsky and Lenin, the degree and scale of capitalist development and peasant disintegration in the countryside were historically contingent and context-specific (within national boundaries), but nonetheless present as a general law of capitalist development.[63] Russian populists, however, argued that the peasantry would persist in capitalist society, because the logic of peasant household production could resist and/or adapt to capitalist pressures (Chayanov 1986).[64] According to Araghi, Chayanov argued "[t]he peasant mode of production was diametrically opposed to

[60] Engels articulated an agrarian question of labor in which he argued that the path to (working class) political power was through the alliance of urban labor and agrarian labor.
[61] Since peasant farmers benefited from high food prices (increased income) at the detriment of the working classes (increased cost of living), food prices, according to Kautsky, were an obstacle to the social democratic movement and revolutionary movements.
[62] I.e., to what extent is the peasantry a revolutionary force in the transition to socialism or democracy? As well as, how is the peasantry integrated into process of industrialization, and what is the transition within the agrarian sector?
[63] Although Kautsky envisioned the general trend of peasant displacement via capital accumulation, he also theorized a functional dualism between peasant agriculture and capitalist agriculture in which the peasantry (or family farms) were sites of labor (re)production for capitalist enterprise. Thus, Kautsky believed that capitalist development would not completely subsume family farms, but relegate them to marginal and auxiliary roles within industrialization. While Lenin did not articulate the functional dualist perspective of Kautsky, he argued that capitalist industrialization via technological advancements of production and the competitive forces lead to the disintegration of the Russian peasantry via processes of agrarian class differentiation (including proletarianization in which marginalized peasants were forced off the land into labor reserves). Lenin saw this rural transformation (the commodification of agricultural production and labor and the differentiation of the peasantry) as a necessary process for industrialization and for the formation of a revolutionary class (1964).
[64] Using Marx's concept of modes of production, Chayanov argued for a uniquely 'peasant mode of production' (Araghi 2009). Whereas capitalist farming was based on the logic of accumulation, peasant agriculture was based on 'subsistence and leisure.' The consumption needs of family farmers were thus more flexible and resilient to market fluctuations than those of capitalist farmers. In times of stress peasant farmers could "over-exploit" family labor, adjust production methods, or reduce consumption needs.

capitalist modes of production" in that peasants were not fully market dependent and were not subject to profit imperatives (2009: 116). Accordingly, many of the early debates on the agrarian question revolved around teleological assumptions of national industrial development and the disintegration or persistence of peasant agriculture.

More recent applications of the agrarian question in 'third world' contexts (Goodman and Redclift 1981, de Janvry 1981)[65] continue to revolve around the original debates of how capitalist transformation of the peasantry (and national capitalist transitions) under pressures of international and national capital accumulation either lead to the relative persistence or the likely disappearance of the peasantry (Bernstein 2001).[66] Problematically, these adaptations, according to Araghi, changed the "political peasant question into a developmentalist peasant question" such that it reproduced teleological theoretical assumptions of the original agrarian question (2009: 118).[67] Additionally, contemporary critiques of the original agrarian question challenge the determinist, evolutionist, and teleological assumptions of both the disappearance and permanence of the peasantry, as well as the nation state framing of the agrarian question (McMichael 2009e, Bernstein 2009, Araghi 2009).[68] The work of Friedmann (1978) provides an early challenge to the path dependent assumptions

[65] In the 1980s, the agrarian question was revisited in light of underdevelopment and dependency theories and applied to 'Third World' contexts (Goodman and Redclift 1981; de Janvry 1981), investigating the ways in which colonial restructuring and the imposition of international unequal terms of trade led to varying trajectories of proletarianization via peasant displacement/disintegration in 'underdeveloped' countries (de Janvry 1981).

[66] Since the demographics of the Global South were still predominantly rural and agrarian-based, Marxist interpretations tended to investigate the particular barriers to capitalist accumulation in agriculture or the functional relations of peasants and capital. Neo-populists, however, employed empirical demographic evidence to maintain their theoretical position (Araghi 2009).

[67] Although the introduction of dependency and underdevelopment theories highlighted some of the limitations of the original debates, that is the relations of international capital and dynamics of capital accumulation and exploitation between core and periphery in the historical context of colonial restructuring, the theoretical intervention remained within the capital/labor framing and national development context of the original agrarian question (Araghi 2009).

[68] The agrarian question was framed in a nation state framework that overlooked global developments in capitalism, the changing relationships between international markets, states and peasants, as well as new forms of transnational resistance (McMichael 1997, 2009e). Furthermore, the permanence/disappearance debate instigated a definitional problem: what constitutes a peasantry?

latent in early agrarian question debates. By detailing the historical contingencies that created conditions for family wheat farmers in the North American frontier to place competitive pressures on wheat farmers in Germany (including capitalist enterprises), Friedmann's research on North American frontier wheat farmers drew attention to world historical processes (including the creation of a single-price mechanism, which facilitated global competition) that complicated the over-reliance on capital accumulation as the central explanatory device in agrarian change.[69] In elucidating the historical conditions that allowed family farmers to compete within international markets, Friedmann's analysis challenged the 'path dependent' assumptions of the classical agrarian question and transcended the state-centrism of the earlier formulations of the agrarian question.

While contemporary debates on agrarian transformations have splintered in multiple new and divergent directions (at least six different reformulations, according to Akram-Lodhi and Kay 2009)[70], some articulations of the contemporary agrarian

[69] The single-price mechanism facilitated a global commodity competition between capitalist agriculture and family farm units in agrarian frontiers, and the relative advantages of these varying approaches was contingent upon state policies and geographical conditions that limited or gave opportunities for expanded production. In this case, frontier family wheat farms in the American West were able to 'persist' at the expense of European (capitalist) farmers, placing pressure through the price mechanism of international markets.

[70] Akram-Lodhi and Kay distinguish six strands of contemporary agrarian questions in a current edited volume titled *Peasants and Globalization* (2009: 22-27). First, the path dependent agrarian question, which is in part a continuation of the classical debate over the inevitable, albeit varied, capitalist agrarian transformation (agricultural commercialization and labor commodification) as applied to the post-colonial world. Second, the global reserve army of labor agrarian question, which stems from a world-historical perspective in which continuities are drawn between the colonial period and contemporary globalization, highlighting the imperialist rearrangement of a global division of labor. Third, the agrarian question of class forces, which argues that 'agrarian transitions' are always contingent upon the dynamics and structures of class relations. Fourth, the decoupled agrarian question of labor, which emphasizes the predominance of transnational capital that has 'decoupled' national capital from national labor. Accordingly, this approach assumes that the agrarian question of capital has been resolved, leaving unresolved the agrarian question of labor (Bernstein 2009). Fifth, pulling on aspects of all the aforementioned discussions, the gendered agrarian question argues that any full understanding of agrarian change must incorporate both the contradictions of class and gender relations. Sixth, the agrarian question of food shifts the analytic focus from capital to food as an embodiment of the relations of production and circulation in historical context. In doing so, the agrarian question of food politicizes the current corporate food regime.

question remain overly reliant on the parameters of the original agrarian question, specifically on the capital/labor lens (see for example Bernstein 1996, 2001, 2009). According to McMichael (2008) formulating a 'new agrarian question' must deal with the limits of the original debates as well as the current neoliberal historical context and its contestations. In formulating a new agrarian question McMichael argues,

> First, peasant trajectories are conditioned by world, rather than national, history. Second, as an instrument of legitimacy, the development narrative's enabling of an intensified peasant dispossession under a virulent neoliberal regime has become the focal point of a contemporary peasant mobilization. Third, conventional (liberal and Marxist) attempts to schematize modern history in developmentalist terms run aground on the shoals of stage theory—democratic outcomes, nationally imagined, are as partial as representations of peasants as historical relics (2008: 206).

In this historical context then, the agrarian question must be understood globally (in relation to national specificities) as transnational capital, with support from international institutions such as the WTO, World Bank, and IMF, has "become the organizing principle of the global economy" conditioning national policies and international development agendas (McMichael 2008: 205). Furthermore, ecological crises invite a rethinking of territorial and temporal features of the agrarian question.[71] Both the perceptions and biophysical realities of global ecological crises, such as climate change and water shortages, present biophysical limits to the spatial and temporal logic of development theory and practice that presumes the continued separation of social reproduction (displacing peasants) from ecological cycles. As such, the contemporary agrarian question, as articulated by agrarian social movements, is also shaped by the politics of global ecological change. The ecological and social crises of agro-industrialization reflect a shifting political terrain of agrarian change and

[71] The biophysical limits as illustrated by climate change and peak oil, present clear temporal limits of agro-industrial model of development, premised on increasing fossil fuel consumption and spatial expansion. These limitations create a backdrop for political struggles around agrarian change.

open a space through which transnational agrarian social movements challenge the dominant capital/labor framing of the agrarian question and dominant development narratives. Whereas capitalist development imposes a temporal and spatial logic that increasingly transforms the spatial and temporal features of ecological cycles and bioregions, agrarian social movements are struggling to re-embed agriculture, both culturally and ecologically. By rejecting corporate led development in support of place-based development alternatives the food sovereignty movement reflects an awareness of the multiple scales of political struggle. Grounded in local and context specific struggles for substantive rights to land and productive resources, the food sovereignty movement also shifts its political focus to national (challenging 'privatized states'), regional (contesting free trade agreements), and global levels (contesting international development institutions).

Furthermore, the emergence of transnational agrarian movements serves to re-establish the socio-ecological significance and political subjectivity of peasant agriculture. As opposed to a fixed social category locked into national development trajectories, the peasantry is an ever-reconstituted social group, defined via relational processes in varying political-economic contexts (Akhram-Lodhi and Kay 2009, Watts 2009). In the case of La Via Campesina and the food sovereignty movement, peasants are capturing this historical moment of rising skepticism towards the social and ecological crises of agro-industrial development strategies as an opportunity to assert their historical agency, redefine development, and reconstitute the categories ascribed by modernist and orthodox Marxist theories.

Accordingly, the contemporary agrarian question debates mirror the epistemic and political points of contestations within development discourse at this historical conjuncture. Competing conceptualizations of smallholder agriculture as articulated in a global double movement of corporate disembedding and a transnational food

sovereignty countermovement are provoking diverging conceptualizations of contemporary agrarian change in both development discourse and the agrarian question. While the political and epistemic implications of dominant development discourse and deterministic formulations of the agrarian question reproduce the narrative of a disappearing and/or proletarianized peasantry, the political and epistemic interventions by La Via Campesina and the food sovereignty movement challenge this narrative and reflect new and emerging possibilities of a transnational countermovement in which the centrality of peasant agroecological knowledge, practices, and local markets can restore and protect social and ecological sustainability.

In contrast to the practical politics of a Polanyian double movement resolution characterized by a countermovement struggling for nationalized markets (i.e. welfare state), the new political configurations and interventions of agrarian social movements and organization, which constitute La Via Campesina and the struggle for food sovereignty, are no longer focused on the nation state, but are multi-layered and reconfigured in particular places and specific contextual struggles. While the political configurations of this transnational countermovement contest corporate and dominant development discourse and practices through international solidarity, the diverse historical, cultural, and political contexts of local, national, and regional resistance and proactive construction of development alternatives implies a multiplicity of projects contingent on the specificities and particularities of each situation. Contesting development narratives and reclaiming the centrality of smallholder-diversified agriculture in sustainable development alternatives is the collective starting point for agrarian social movements in creating agendas for specific, diverse, and cultural and geographically situated agrarian reforms. La Via Campesina argues, "Contrary to what authorities and agribusiness often say, small farmers are not deforesting the

world. Industrial plantations are currently by far the major cause of land clearing and deforestation. The world does not need more industrial monocultures; it requires many forms of diversified agriculture that can incorporate and cohabit with trees" (La Via Campesina 2009: 17). It is through these alternative valuation systems La Via Campesina and the food sovereignty movement poses epistemic challenges and political contestations to economistic and deterministic framings in both development discourse and the agrarian question, opening the space for re-imagining development. La Via Campesina and the food sovereignty movement expose the paradox and contradictions of dominant development narratives in revealing that the fate of the peasantry is both an ecological and an epistemic dilemma, as the loss of tacit locally embedded knowledge built upon generations of socio-ecological 'co-evolution' will be difficult to restore and yet is necessary in mending the social and ecological crises of capitalist modernity.

APPENDIX A
A CASE STUDY: THE PALM OIL FOOD/FUEL COMPLEX

Palm oil is one of the major biofuel feedstocks produced in the world, along with sugar, corn, and soy. Originating in central Africa, palm oil was introduced to Southeast Asia in the 19th century, but was not planted as monocultures until the 1960s in Malaysia and the 1980s in Indonesia. Global production has increased 30 fold since the 1960s, with Indonesia and Malaysia accounting for 81% of production. The versatility of palm oil as a food additive and cosmetic ingredient drove its rapid expansion in the 1990s and early 2000s, such that it recently eclipsed soybean oil as the most consumed edible oil in the world. Palm oil is used as a food additive (favored for its semi-solid consistency) and for cooking oil, and can be found in products such as chocolate products, cake icing, ice cream, margarine, peanut butter, coffee whitener, canned cream soups, sauces, baked goods, trail mix, snack foods and microwavable foods. It also has industrial/chemical uses such as lubricants, detergents, soaps, cosmetics, makeup remover, body lotion, and sun cream. While the processed food revolution propelled the initial growth of palm oil plantations, the opening of biofuel markets further ramped up production over the past five years. By 2004, the Indonesia government was planning a 43-fold expansion of its existing 6.5 million hectares of palm oil plantations in Sumatra and Kalimantan, or a target of roughly 26 million hectares by 2025 (Smolker, Tokar, and Petermann 2008). In 2006 alone, Malaysia planted an additional 4 million hectares of palm oil (Ibid). Bolstered by tax incentives, subsidies, and domestic targets, there is a massive influx of capital investment for South East Asian palm oil production, from private firms to national governments including the China National Offshore Oil Corporation, Sinar Mas Group, Raja Garuda Mas, PT Wilmar Bioenergy, Shell, Neste Oil, Green energy International, BioX, Cargill and Archer Daniels Midland, as well as investments from China, Japan, India, Brazil and South Korea (Ibid; GRAIN 2007).

Nearly half (48%) of Indonesia's land cover is tropical rainforest, containing some of the world's most species-rich habitats. Listed as one of the Conservation International Sundaland Hotspots, Indonesia hosts 10% of the worlds plant species, 16% of all reptiles and amphibians, 12% of mammal species, and 17% of all bird species (Smolker et al 2008). However, the rush to clear land for palm oil plantations has placed Indonesia as one of the fastest deforesting regions in the world. As a result of released forest carbon from clearing, Indonesia is also the 3rd largest emitter of green house gases, following the U.S.and China, and a number of species are under threat of extinction, including some of the last populations of Orangutans. Logging companies are also making windfall profits in their alliance with agribusiness, as they clear the forests before palm companies burn the residues and plant palm seedlings. The conversion of tropical rainforests into palm plantations is an ecological catastrophe. Palm oil plantations are water-intensive landscapes and require large amounts of fertilizers, pesticides, and fungicides (including Syngenta's pesticide paraquat dichloride which is banned in many countries including the U.S.and EU because of its high toxicity). An estimated 87% of deforestation between 1985 and 2000 can be attributed to palm oil expansion in Malaysia and has escalated since the biofuel boom over the past 5 years.

In terms of carbon storage, peat lands are particularly critical habitats. Peat land is high in soil organic matter, which contains large amounts of carbon. When tropical forests are cut, peat lands are left exposed to the sun, rain and wind, increasing rates of soil drying, and soil erosion. Converting forests to agricultural plantations, thus, drastically reduces soil carbon storage by as much as 40% (Smolker et al 2008). While deforestation from logging has major negative environmental effects, the conversion to palm plantations has a more lasting environmental effect. Whereas degraded forests, affected by logging, can re-grow, monocrop palm plantations

represent a more complete transformation (biological simplification) of forest ecology (Vandermeer and Perfecto 2005). At best, palm plantations contain 20% of the biodiversity of forests (Smolker et al 2008).

Palm plantations are also displacing indigenous people (Tauli-Corpuz 2008). There are around 40-45 million indigenous people in Indonesia that depend on forests for their livelihoods (Smolker et al 2008; Tauli-Corpuz 2008). Appropriations of indigenous land have spurred conflicts, and between 1998 and 2002, 479 people were reported as being tortured over land conflicts, and dozens were killed (FoE). Victoria Tauli-Corpuz, Chairwoman of the UN Permanent Forum on Indigenous Issues, recently "warned that 60 million indigenous people worldwide…are likely to be driven off their land and in the near future to make way for agrofuel plantations" (GRAIN 2007: 27). Palm oil companies have violated customary land rights and, in some cases, have confiscated locally owned lands in Indonesia (Cotula, Dyer and Vermeulen 2008).

The palm oil plantations in South East Asia not only reflect the shortsightedness of development strategies based on agrofuel projects, but also the emerging dynamics of the food/fuel complex. As global biofuel demands expand new commodity markets, the fungibility of palm oil allows agribusiness corporations to negotiate and leverage multiple markets (energy, food, and other bio-products). Likewise, Big Oil corporations can diversify their risk by leveraging palm oil and crude oil markets. Will the price of palm oil rise and fall with the price of crude oil? If so, what does this tell us about the historical moment of capitalist agriculture and its social and ecological contradictions? The merging of Big Oil corporations and agribusiness around agrofuels illustrates a further abstraction of agriculture, deepening commodity relations and obscuring the socio-ecological functions agriculture (the necessary relation between social reproduction and ecological reproduction). It also reflects a

fetishised economistic valuation system that devalues local economies in favor of global market integration, placing export currency above cultural and ecological survival. Market fetishism and export-led strategies of development institutions are pushing to replace indigenous-based economies, not only destroying the ecology but also displacing systems of knowledge that evolved from a long history of cultural interaction with the local ecosystems (Martinez-Alier 2002).

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